



CREATING CONFIDENCE AMONGST COMPLEXITY:

**THE ‘LIVED EXPERIENCE’ OF CLIENT-SIDE
PROJECT MANAGERS IN THE AUSTRALIAN
CONSTRUCTION SECTOR.**

A Thesis submitted by
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Abstract

The client-side project manager is a professional who manages projects within complex and dynamic environments while ensuring their client's interests are protected and maintained. This thesis explores the 'lived experience' of client-side project managers who deliver projects in the Australian Construction sector. In this sector, client-side project managers are regularly confronted with challenges such as poorly defined project scope, disparate and conflicting stakeholder expectations, and countless opportunities for carefully planned and rigorously monitored projects to encounter unforeseen events that can ultimately result in the project being regarded as a failure.

Little is known about the 'lived-experience' of a client-side project manager, and even less about how they deal with these challenges to effectively manage their project work. Client-side project management has traditionally been considered a form of production management. However, in many ways, this perception appears at odds with the 'lived-experience' of client-side project management practitioners. Through this thesis, I argue that this perception is hindering the development of the body of theory for the profession by limiting discussions within unjustified constraints and restricting the development of tools that could help client-side project managers perform crucial elements of their role.

This thesis comprises a collection of publications that investigates the 'lived experience' of client-side project managers. How they think; how they manage ambiguity, conflicting expectations, and poorly defined problems; and ultimately how they create value in the project delivery process.

During the course of my candidature; I have published thirteen papers. Seven of these papers (one theoretical and six empirical) have been included in this thesis. All of the empirical papers adopted qualitative research methodologies, the most predominant of these is Grounded Theory. This particular methodology aligned well with the emerging nature of the research included in this thesis. The themes of the thesis move from a broad recognition and understanding of a divide that exists between the theory and practice of client-side project management, through to a detailed analysis of how a cohort of practitioners adopt the role of System Specialists to deliver their projects, and thereby create value through managing a complex network of actors.

Through this thesis I will argue that the ‘lived experience’ of client-side project management is not supported by the traditionally accepted theoretical foundations of Transformational Production Management, and I call for a broader theoretical basis for the profession. I argue that client-side project managers operate beyond the role of project Implementers and instead play a critical role in managing a complex value network. This network is created to deliver the strategic, technical, financial and human goals which clients are expecting from their projects. As I will demonstrate through this thesis, achieving these outcomes requires client-side project managers to think more strategically, holistically and creatively about their projects than the current theoretical foundations of their profession supports.

This thesis will demonstrate that client-side project managers must balance both the success and satisfaction paradigms of their projects, manage Drift-Changes and attempt to create Project Management Yinyang. To achieve this they utilize Design Thinking Mentalities, Thinking Styles, Practices and Tools, and act as System Specialist who create network Constructs and Controls to create value.

This thesis outlines multiple opportunities for project management researchers to pursue. These include, but are not limited to, new project management practices such as Funnelling and Optioneering, the role of Design Thinking in the practice of client-side project management and how client-side project managers create value by acting as System Specialists. In addition this thesis provides insight in to new skills, competencies and tools which practitioners can adopt if they wish to become more proficient in their craft.

In summary, this thesis demonstrates that the ‘lived experience’ of the client-side project manager is not the ordered, rational and well planned experience that the traditional theoretical foundations of the profession would have us believe. Instead it is dynamic and complex, as well as exciting and challenging. Client-side project management demands a high level of technical expertise combined with highly developed social skills and creativity. It requires optimistic professionals who are capable of balancing paradoxes, navigating through ambiguity, relentlessly pressing forward in the face of uncertainty and who have the intellectual capacity to manage a complex value network using an action-as-planning approach. Finally, in the midst of all this, they must foster the belief among all the stakeholders that the Functionality and Representation of value required by the project is

achievable. Consequently, the client-side project manager creates confidence among complexity.

Glossary of Terms

<i>Client-side project management</i>	A form of project management in which the practitioner's role is to protect their client's interests by ensuring the project delivers the required Functionality and Representation of value expected by the sponsoring organisation.
<i>Client-side construction project manager</i>	A client-side project management practitioner who delivers construction projects.
<i>Client Satisfaction</i>	The state achieved by fulfilling the subjectively assessed expectations of stakeholders. (See also 'Representation of value').
<i>Confidence Locks</i>	Hold points within a Knowledge Funnel that must be released by the client-side project management practitioner if the project is to proceed.
<i>Convergence</i>	The state that exists when elements of a duality or plurality achieve a tight structural coupling.
<i>Design Thinking</i>	A team based, human-centred cognitive process that utilizes a combination of analytical thinking and intuition to develop creative solutions to complex, or poorly defined problems.
<i>Drift Changes</i>	A specific change typology that delivers project outcomes that were not requested or originally anticipated by the project stakeholders.
<i>Duality (Plurality)</i>	The existence of two (or more) components within a construct that create tension. In this thesis dualities and pluralities are further categorised as either dilemmas, dialectics, or paradoxes.
<i>Functionality</i>	One of two aspects of value (see also Representation of Value) which must be present for the creation of value in a network. Functionality is the minimum core purpose that the users wish to put the offering to.

<i>Funnelling</i>	The practice of guiding multiple project pathways or fragmented stakeholder expectations, towards a state of uniformity.
<i>Knowledge Funnel</i>	A concept developed in Design Thinking literature to explain the process of progressing from a poorly defined problem to clearly defined solution.
<i>Nested Project Management Knowledge Funnel</i>	An adaptation of the Knowledge Funnel used to explain a value creation process utilized by client-side project managers when they adopt the role of Systems Specialists.
<i>Network Construct</i>	A unique hypothetical framework developed from the specific constraints, restraints and parameters dictated by the environment, the requirements and the competencies of the available network actors. A Network Construct provides network actors with a definition of what is to be achieved and the acceptable means for attaining that objective.
<i>Network Controls</i>	A combination of Strategic, Implementation and Fine-Tuning processes created to ensure networks achieve both Functionality and the Representation of value.
<i>Optioneering</i>	The practice of presenting specifically selected options to stakeholders in order to manage paradoxes.
<i>Project Success</i>	The state obtained when objectively assessable project metrics are achieved within agreed constraints.
<i>Project Management Yinyang</i>	A state that exists when project success is tightly coupled to client satisfaction.
<i>Representation of Value</i>	One of two aspects of value (see also Functionality) which must be present for the creation of value in a network. It refers to everything other than Functionality that network actors expect to achieve from their involvement in the value creation

experience. This not only includes the personal benefits which they will derive from using the product, but also the emotional satisfaction they want to experience by participating in the process.

Structural coupling

The strength of the relationship that exists between two elements of a system. A tight coupling represents a strong relationship. A loose coupling represents a weak relationship.

System Specialist

A visionary and facilitator who formulates and guides the development of the Network Construct and Controls so they deliver the required Functionality and Representation of Value.

Traditional Project Management theory

Project management theory derived from Transformational Production Management. This theory conceptualises the role of project management predominantly in terms of planning and control.

Certification of Thesis

This thesis is entirely the work of Gregory Stewart Usher except where otherwise acknowledged. The work is original and has not been submitted for any other award.

Student and supervisor's signatures of endorsement are held at USQ.

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Principal Supervisor

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Statement of Co-authorship

Table X-1-1: Details of Co-authorship

Article Citation	Percentage of Authorship	Confirmation of Co-author
Usher, G., Whitty S. J., (2014). "Towards a new theory of project management: Could client-side, construction, project management be a form of strategic management?" In: Qi, A., (ed), <i>Theory meets Practice in Project Management</i> , Proceedings of the 2 nd Research Conference of the International Project Management Association, 2014. Tianjin, China. Nankai University, pp126-137.	Usher, G. 80%	Dr S. Jonathan Whitty
Usher, G. & Whitty, S. J. (2017). "Identifying and managing Drift-changes". <i>International Journal of Project Management</i> , Vol. 35 No.4, pp 586-603.	Usher, G. 80%	Dr S. Jonathan Whitty
Usher, G. & Whitty, S. J. (2017). "Project Management Yinyang: Coupling project success and client satisfaction". <i>Project Management Research and Practice</i> , Vol. 33 No.5, Jan-Jun 2017.	Usher, G. 80%	Dr S. Jonathan Whitty
Usher, G. & Whitty, S. J. (2017). "The final state convergence model". <i>International Journal of Managing Projects in Business</i> , Vol. 10 No.4, pp 770-795.	Usher, G. 80%	Dr S. Jonathan Whitty
Usher, G. & Whitty, S. J. (2017). "Embracing Paradox: Utilizing Design Thinking in Project Management". In <i>Innovate, Influence and Implement</i> . Proceedings of the Australian Institute of Project Management National	Usher, G. 90%	Dr S. Jonathan Whitty

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“Managing Project Management Paradoxes through Design Thinking”	Usher, G. 90%	
In Press by <i>Project Management Research and Practice</i>	Whitty, S Jonathan 10%	Dr S. Jonathan Whitty
“The client-side project manager – a practitioner of Design Thinking.”	Usher, G. 90%	
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“Creating value through client-side project management.”	Usher, G. 90%	
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*Dedicated to
My wife and family*

Additional publications not forming part of this thesis

The following works were completed during the period of my candidacy and are of relevance to this thesis. However, these works do not form part of the examinable thesis.

Table X-1-2: Additional publications not forming part of this research

Citation
Usher, G (2013). "Inviting Project Management into the Boardroom". Vol II. http://pmworldjournal.net/article/inviting-project-management-boardroom/
Usher, G (2013). "Bring PM to the Centre". <i>Project Manager</i> , Vol June-July, pp 10-13
Usher, G (2013). "Achieving Strategic Integrity". <i>Project Manager</i> , Vol December – January, pp 28-32.
Usher, G (2014). "Enhancing Strategic Integrity through Project Management". Vol III. http://pmworldjournal.net/article/enhancing-strategic-integrity-project-management/
Usher, G. "Hail Caesar, The Stoics Guide to Project Management". Currently under review by <i>Project Manager</i>

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1 Introduction

1.1 Background

The discipline of project management is changing. These changes are not slow, evolutionary graduations that allow researchers, academics and practitioners time to study and prepare for the future. These are rapid changes that have the potential to impact everything from the theoretical foundations that underpin the discipline's systems, process, tools and practices, to the way the discipline is perceived by organisations across the globe (Thomas et al., 2002, Koskela and Howell, 2002b, Ingason and Jónasson, 2009, Usher, 2013, Cicmil et al., 2017).

Newly identified project typologies such as Complex, Mega and Wicked projects (Giezen, 2012, Giezen et al., 2015, Oehmen et al., 2015, McCall and Burge, 2016) are creating new types of challenges that require new ways of viewing the discipline. Despite the changing landscape of project management, modern-day practitioners continue to approach their projects using systems, processes, practices and tools developed at the beginning of the 20th century. These systems, processes, practices and tools were developed to assist factory managers increase production and efficiency (Taylor, 1911); are based on a positivistic epistemology (Cicmil et al., 2006, Thomas and Mengel, 2008, Bredillet, 2004) and operate in 'hard paradigms' with reductionist techniques and scientifically quantifiable metrics (Aritua et al., 2009, Stretton, 2014).

Many project management researchers are now suggesting that there is a divide developing between the practice of project management we needed in the past and the practice of project management we will require in the future. They claim that the discipline of project management has reached the limits of its traditional theoretical foundations and must expand its base of knowledge if it is to meet the challenges of the new millennium (Cooke-Davies et al., 2007, Morris, 2007).

This growing realization that the discipline of project management must adapt if it is to meet these new challenges was the subject of the Rethinking Project Management Network research project (Winter et al., 2006). Commissioned in 2006 by the UK's Engineering and

Physical Sciences Research Council, this collaborative two-year study resulted in a proposed agenda for the new areas of research that would be necessary for the continuing development of the discipline (Winter et al., 2006).

Central to this proposed agenda was the need for new ways of conceptualizing project management theory and practice. The Rethinking Project Management Network specifically highlighted the importance of understanding the practice of project management in different social constructs. Or to state this another way, through the ‘lived experience’ of project management (Winter et al., 2006, Cicmil et al., 2006). This call for a nuanced understanding of project management has resulted in a range of novel project management research projects. These include adopting alternative philosophical, ontological and epistemological perspectives for investigating the practice of project management, as well as the use of new research paradigms and lenses (Cicmil et al., 2017, Cicmil et al., 2006, Cooke-Davies et al., 2007, Whitty, 2011, Whitty, 2010, Van der Hoorn, 2017, Smyth and Morris, 2007).

Despite being over a decade since the Rethinking Project Management Network’s proposed agenda was first published and the plethora of research conducted as a result, the agenda for Rethinking Project Management still contains considerable opportunities for new research and the continuing advancement of the discipline (Saynisch, 2010, Svejvig and Andersen, 2015). The Rethinking Project Management Network’s proposed research agenda outlined five directions, grouped into three themes. These themes are Theory *about* Practice; Theory *for* Practice; and Theory *in* Practice. These themes are pertinent to the development of this thesis and will be discussed in more detail in subsequent chapters.

This thesis responds to the Rethinking Project Management Network’s call for a new understanding of the ‘lived experience’ of project management by engaging with a cohort of client-side project managers who deliver projects in the Australian Construction Sector.

In researching this thesis I found:

- (a) The practice of client-side project management is not sufficiently supported by its traditional theoretical foundation of Transformational Production Management;

- (b) Client-side project managers need to be aware of, and manage, the project success and client satisfaction duality that exists within their projects;
- (c) Client-side project managers operate in both deliberate and emergent environments simultaneously. This creates a paradox in which detailed planning activities are necessary but are, at the same time, of very limited use;
- (d) The projects undertaken by client-side project managers behave as bounded, complex adaptive systems. These systems create multiple pathways for reaching the final project outcomes, and multiple expectations within the project stakeholder group, and causes projects to develop non-linear and non-sequential trajectories which must be simultaneously encouraged and controlled by the client-side project manager;
- (e) Client-side project managers utilize Design Thinking Mentalities, Thinking Styles, Practices and Tools to manage ambiguity, paradoxes and unexpected events within their projects; and
- (f) Client-side project managers act as System Specialists, and manage highly complex value networks to ensure their projects achieve the required Functionality and Representation of Value. They achieve this by creating and managing the network Constructs and Controls¹ necessary create value through their projects.

1.2 Thesis structure

The research presented in this thesis can be broadly divided into three sections, these are:

¹ The terms 'Network Construct' and 'Network Controls' provided in the glossary were established in the final data analysis process (i.e. research for Chapter 9). However, many of the articles included as chapters in this thesis had already been published. In order to allow the reader to understand the relationship between these terms in the early publications and the later ones (while still maintaining the integrity of the published articles) I highlight that the use of capitalized 'Construct' and 'Controls' throughout this thesis refers to the terms 'Network Construct' and 'Network Controls' as defined in the glossary.

- (i) Revealing the theory/ praxis divide;
- (ii) Modelling the ‘lived experience’; and
- (iii) Shifting from ‘Project creation’ to ‘value creation’.

Not only do these sections present the structure of this thesis, they also provide a grounding for the reader in how the research emerged through the duration of my candidacy.

Fig 1-1 presents these sections as a ‘Thesis Structure Map’. This map is provided at the commencement of each of the thesis chapters to allow the readers to position the chapter within the broader sections.

By visualising the progression of these sections, it is my hope that the reader will be able to better follow my thought processes and, hopefully, join me on my ‘journey of discovery’ as each chapter is presented.

This thesis presents the findings from thirteen research papers that are published in international, peer-reviewed journals; presented at international and domestic project management conferences; or published in industry journals over the period of my candidacy. Seven of these peer-reviewed articles were selected for inclusion in this thesis and are presented as Chapters 3 through to 9. The citation information of the articles not included as chapters in this thesis are in Table X-2.

Each Chapter from 3 to 9 represents a different research paper. These chapters present themes that build towards the final contribution of this thesis to the project management body of knowledge.

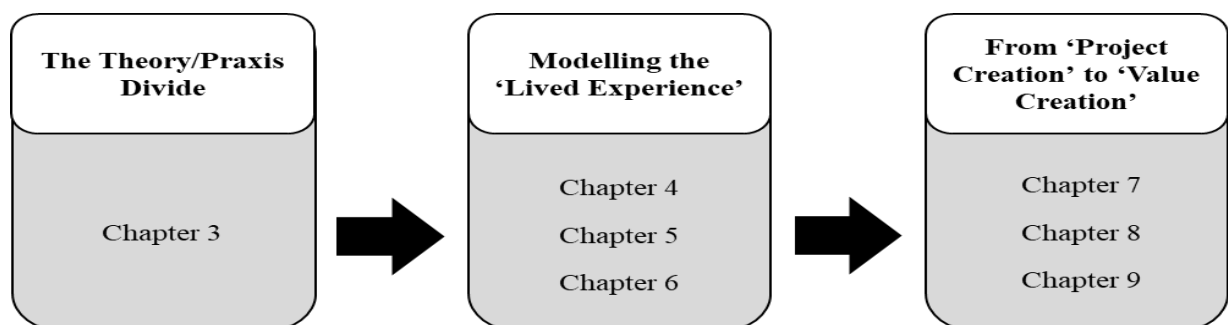


Figure 1-1: Chapters grouped into the Thesis Structure Map.

1.2.1 Section 1: The Theory/Praxis Divide

This section demonstrates how Traditional Project Management theory, with its focus on planning and control, was developed from the combined management theories of Taylorism, Fordism and Shewhart. This theoretical foundation has provided a number of useful tools and practices for the discipline. However, it does not account for many of the challenges faced by modern client-side project managers. As a result, this section argues for a broader theoretical base to support the ‘lived experience’ of the client-side project manager in the Australian Construction sector.

Section 1 highlights the challenge that client-side project managers face when they try to convert poorly defined project objectives and stakeholder desires into formalized, structured and codified documents that can be used in the Construction process (Fig 3-3). The section argues that this particular challenge is not even contemplated within the Traditional Project Management body of theory and as such it provides practitioners with no framework, tools or practices for addressing this situation. However, this thesis does address this specific challenge later (Section 3: From ‘project creation’ to ‘value creation’) by demonstrating how client-side project managers create value in the Construction process through the application of Design Thinking and by acting as System Specialist to create the Construct, Controls, and Confidence necessary deliver both the Functionality and Representation of Value required by the network actors.

Section 1 also demonstrates how client-side project managers must concurrently manage the competing demands created by the Deliberate and Emergent elements of the Construction environment. This section argues that Strategic Management could potentially augment the Traditional Project Management body of theory to provide a theoretical foundation for understanding the Deliberate and Emergent duality within client-side project manager’s ‘lived experience’.

Section 1 also introduces the idea that a duality that exists between the concepts of objectively assessed project success and subjectively assessed client satisfaction. Although initially identified in this Section 1, the implications of this duality would not be not fully

appreciated until the models in Section 2 were created and the need for convergence and structural coupling was discovered.

1.2.2 Section 2: Modelling the ‘lived experience’

The second section of this thesis (Chapters 4, 5 & 6) presents a number of models developed to explain and illuminate the ‘lived experience’ of the client-side project manager. All of the models presented in this section were developed to answer the call by the Rethinking Project Management Network for new research which “...illuminate[s] the complexity of project management... [through] new images, concepts, frameworks and approaches to help practitioners actually deal with complexity in the midst of practice...” (Winter et al., 2006. P.643). These models also challenge the assumption that a deterministic model provides the best option for understanding the ‘lived experience’ of managing project work (Svejvig and Andersen, 2015).

Chapter 4 introduces the concept of Drift-changes. This change typology challenges some of the tenets of Traditional Project Management theory by demonstrating that Construction projects can experience events that do not transpire in a planned, linear or sequential manner. These events impact the client-side project manager’s ability to undertake detailed planning of the entire project. Chapter 4 also begins to expound on the duality of project success and client satisfaction. This chapter also introduces, in embryonic form, the need for further investigation into the role client-side project managers have in the value creation process of project work.

Chapter 5 undertakes a deeper investigation of the project success/client satisfaction duality that was identified in Chapters 3 and 4. The search for a framework to understand how the two elements of this duality are made to work together and influence one another led me to view the practice of the client-side project management through a different philosophical lens – the lens of Taoism. Chapter 5 provides crucial insight into the systemic discourses and language games inherent within the practice of the client-side project manager and highlights the need for a tight structural coupling of these elements if they want to truly ‘manage’ their projects. Chapter 5 also introduces the concepts of multiple pathways, multiple expectations and funnelling - all of which are developed in later chapters.

Chapter 6 presents ‘The Final State Convergence Model’. This model was developed by combining elements of Transformational Production Management (Chapter 3 and 4), Strategic Management (Chapter 3) and Complexity bodies of theory. This model provides a visual demonstration of the client-side project manager’s ability to manage the non-linearity and non-sequentiality inherent within their practice (Chapter 4), incorporates multiple pathways, multiple expectations, funnelling and convergence (Chapter 5) and expands the discussion and understanding regarding the success/satisfaction duality (Chapters 3,4 and 5). Chapter 6 also introduces the need for a better understanding of the value-creation that client-side project managers practitioners bring to the Construction process.

1.2.3 Section 3: ‘Project creation’ to ‘value creation’

The third section of this thesis (Chapters 7, 8 and 9) explores how client-side project managers create value in the Construction process. In doing so, this section aligns with the Rethinking Project Management Network’s recommendation for research that shifts the practice of the project manager from project-creation to value-creation (Winter et al., 2006).

This exploration commences by revisiting the concept of the paradoxes the client-side project manager must deal with; which were first identified in Chapter 5. Chapter 7 addresses two specific paradoxes that regularly manifests in the ‘lived experience’ of the client-side project managers who deliver Construction projects. These are the predictable/unpredictable nature of Construction projects, and the control/flexibility paradox necessary to deliver Construction projects. This chapter demonstrates how these practitioners adopt Design Thinking to manage these paradoxes.

Chapter 8 further develops the theme of value-creation through the application of Design Thinking. Chapter 8 demonstrates that client-side project managers use Design Thinking Mentalities, Thinking Styles, Practices and Tools to manage poorly-defined projects or unexpected challenges. Identifying the application of Design Thinking in this setting provides a strong indication that these practitioners are operating at both Strategic and Tactical levels within their projects, thereby expanding their role from ‘implementation only’ activities to

‘problem-framing and resolution’ activities. Chapter 8 also outlines 15 project management tools used by client-side project managers that align with the Design Thinking literature.

Chapter 9 investigates how client-side project managers adopt the role of System Specialist in order to manage highly complex value creation networks. This chapter demonstrates how client-side project managers develop the Structural, Relational and Cognitive Dimensions of the network Construct, and the Strategic, Implementation and Fine Tuning Controls necessary to deliver Functionality and the Representation of Value required by the network actors. Finally, Chapter 9 introduces the Nested Project Management Knowledge Funnel and its associated Confidence Locks, and explores the role that client-side project managers have in creating the Confidence necessary release these locks.

1.3 Research Contributions to the Scholarly Community

The research conducted to develop this thesis has resulted in a number of contributions to both the project management research and practitioner communities. These contributions are summarized in Table 1-1.

Table 1-1: Scholarly contribution by Thesis section

The Theory/Praxis Divide

- Identification of the shortcomings of Traditional Project Management theory to fully support the ‘lived experience’ of client-side project managers in the Australian Construction sector.
- Identification of Strategic Management as a potential body of theory that could augment Traditional Project Management theory to support the ‘lived experience’ of client-side project managers in the Australian Construction sector.

Modelling the 'Lived Experience'

- Identification of a new change typology in the client-side project management experience;
- Additional understanding of the corrective actions adopted by client-side project managers, when they are faced with unexpected events;
- Clear conceptualization of the Project Success/Client Satisfaction duality within client-side project management;
- Identification of funneling and convergence as processes for managing the challenges associated with multiple pathways, multiple expectations and unexpected events experienced by client-side project managers;
- Development of a broader theoretical foundation for the 'lived experience' of client-side project management practitioners through a synthesis of Transformational Production Management Theory, Strategic Management Theory and Complexity Theories.
- Creation of three new models for conceptualizing the 'lived experience' of client-side project managers in the Australian Construction sector.

From 'Project Creation to 'Value Creation

- Evidence of paradoxical tensions that exist within the client-side project management experience;
- Evidence of client-side project managers adopting Design Thinking techniques to manage these paradoxical tensions;

- Evidence of client-side project managers utilizing a Knowledge Funnel framework to manage complex or poorly-defined problems;
- Evidence that client-side project managers utilize an action-as-planning methodology when delivering Construction projects. This finding runs contrary to Traditional Project Management theory requirements for early, detailed, project planning;
- Identification of the client-side project management practice of Optioneering.
- A new conceptualisation of the social processes adopted by client-side project managers by investigating practitioners as ‘problem-solvers’ not just ‘project implementers’;
- Evidence of client-side project managers utilizing Design Thinking Mentalities, Thinking Styles, Practices and Tools when delivering Construction projects;
- Identification 15 project management tools used by client-side project managers which align with the Design Thinking literature.
- Evidence of client-side project managers operating in the role of System Specialists in value creation networks to develop network Constructs and Controls;
- Discovery of the Nested Project Management Knowledge Funnel and its associated Confidence Locks; and
- Providing an explanation of how client-side project managers can release the Confidence Locks.

1.4 Synopsis

This thesis consists of 11 chapters which provide the scientific and practitioner communities with a better understanding the ‘lived experience’ of client-side project management in the Australian Construction sector. Many of the themes included in these papers were developed, refined and subsequently published throughout my candidacy. For this reason, many of the chapters include unavoidable repetition as readers from different journals are introduced, or reintroduced to important themes. A synopsis of each chapter of this thesis is outlined below:

1.4.1 Chapter 1

Chapter 1 provides a high-level introduction to the purpose and structure of this thesis. It outlines the Background to the development of the thesis, the Research Approach and Structure of the thesis. It also provides an overview of each chapter in the thesis.

1.4.2 Chapter 2

Chapter 2 provides an insight into my personal reasons for undertaking my doctoral studies by outlining the drivers for my research. In addition, this chapter provides a literature review designed to sensitize the reader to important and recurrent themes presented throughout this thesis.

The literature review presented in Chapter 2 is not intended to provide an exhaustive summary of the thesis themes because many of the chapters throughout this thesis include detailed literature reviews specific to the respective chapter. However, it does provide sufficient context to allow the reader to position these themes in the extant literature so they can follow the development of this thesis.

The themes outlined in this chapter that are relevant to this thesis are:

- (i) The need to expand and augment the theoretical foundations which underpin the practices of client-side project managers.

- (ii) The importance of the ‘lived experience’ in expanding and illuminating that foundation.
- (iii) The existence of dualities, pluralities and different functional systems within the ‘lived experience’ of client-side project managers.
- (iv) Shifting client-side project manager’s focus from ‘project creation’ to ‘value creation’.

1.4.3 Chapter 3

Chapter 3 presents a theoretical paper which is published and was presented as part of the Australian Institute of Project Management’s (AIPM) 2014 conference. The paper is titled “*Rethinking Project Management Theory: A case for a paradigm shift in the foundational theory of client-side Construction project management*” and was written in response to the observed conflict between the ‘lived experience’ of *client-side project managers* and *Traditional Project Management* theory.

This paper argues that Traditional Project Management theory is based on Transformational Production Management, which in turn was based on the theories of Taylorism, Fordism and Shewhart. This paper provides a comparative analysis of Transformational Production Management theory against Strategic Management theory to assess which body of theory provides the better theoretical basis for the ‘lived experience’ of a client-side project manager in the Australian Construction sector.

This paper concludes that the taxonomy used to classify client-side project management as Transformational Production Management is based on a narrow view of the profession. Moreover, it argues that this situation is possibly hindering the development of client-side project management by limiting discussion to pre-defined constraints.

The themes outlined in this chapter that are relevant to this thesis are, that:

- (i) Traditional Project Management theory is based on Transformational Production Management Theory;

- (ii) There is a theory/praxis divide within the client-side project manager's 'lived experience';
- (iii) Dualities exist within the 'lived experience' of client-side project managers that are not explained by Traditional Project Management theory; and
- (iv) Traditional Project Management theory should be augmented with other bodies of theory to address the divide and dualities.

1.4.4 Chapter 4

Chapter 4 presents an empirical paper that addresses a particular challenge identified from the 'lived experience' of client-side project managers within the Australian Construction sector. Published in the International Journal of Project Management this paper, titled "*Identifying and managing Drift-Changes*", focuses on the challenges created by unexpected events that occur during the Construction process.

This paper presents a new change typology that can occur during the Construction process. These changes, which I have termed Drift-Changes, occur as a result of external influences which impact on Construction projects causing the project to deliver outcomes that were not originally requested by stakeholders. This paper demonstrates how a Construction project can, though the skill of the client-side project manager, achieve both project success and client satisfaction despite significant deviation from the project's originally anticipated goals.

This paper was the first of my published works to identify the importance of the project success/client satisfaction duality within the client-side project manager's 'lived experience'. It was also the first to examine the concept of value-creation by the client-side project manager.

The themes outlined in this chapter that are relevant to this thesis are:

- (i) The difference between project success and client satisfaction in the 'lived experience' of the client-side project manager.

- (ii) Understanding how shifting project trajectories can create new pathways to project completion, and the role this plays in achieving both project success and client satisfaction.
- (iii) Value-creation by the client-side project manager.

1.4.5 Chapter 5

Chapter 5 presents an empirical paper which views the ‘lived experience’ of client-side project managers through the philosophical lens of Taoism. This lens was selected to highlight the duality of project success and client satisfaction that exists within the practice of client-side project management. This paper, titled “*Project Management Yinyang: Coupling project success and client satisfaction*”, is published in the Project Management Research and Practice Journal.

By adopting the lens of Taoism, this paper was able to provide clarity regarding the project success/client satisfaction duality by showing how different systemic discourses and language games were operating in the client-side project management ‘lived experience’. In addition, this paper also introduces the concepts of structural coupling, multiple pathways to completion, non-uniformity of stakeholder expectations, and funnelling – all of which feature in subsequent papers and chapters.

The themes outlined in this chapter that are relevant to this thesis are:

- (i) Systemic discourses and language games.
- (ii) The existence of dualities within the ‘lived experience’ of client-side project managers.
- (iii) The importance of structural coupling to manage these dualities.
- (iv) The need for Focus and Convergence.

1.4.6 Chapter 6

Chapter 6 presents an empirical paper which develops a new model for understanding the ‘lived experience’ of client-side project managers. This paper, titled “*The Final State Convergence Model*” is published in the International Journal of Managing Projects in Business, and presents a model synthesized from the theories of Transformational Production Management, Strategic Management and Complexity, as well as from case studies and a focus group.

The Final State Convergence Model draws together themes such as systemic discourses and language games, non-linearity and non-sequentiality (i.e. multiple pathways to completion), multiple, variant stakeholder expectations and finally, the themes of focus, convergence and funnelling. This chapter highlights that further research is required into the process of value-creation by the client-side project manager.

The themes outlined in this chapter that are relevant to this thesis are;

- (i) Modelling the ‘lived experience’ of client-side project managers.
- (ii) Conceptualizing non-linearity, multiple pathways, focus, convergence, systemic discourses (project success/client satisfaction) within a new model of client-side project management.
- (iii) Augmentation of Traditional Project Management theory with Strategic Management and Complexity theories.
- (iv) Introducing ‘value creation’ into the discussion of the ‘lived experience’ of client-side project managers.

1.4.7 Chapter 7

Chapter 7 presents an empirical paper which has been accepted for publication in *Project Management Research and Practice*. This chapter investigates the practice of client-side project management through the lens of paradox theory, and focuses on the tensions created by two paradoxes within Construction projects. These are the predictable/unpredictable and the control/flexibility paradoxes.

This chapter investigates how client-side project managers appear to exhibit the characteristics of Design Thinking when managing these paradoxes. The research presented in this chapter finds that client-side project managers simultaneously adopt a structured and structuring perspective of their projects and use these to develop multiple pathways for achieving their project outcomes. In addition, the research presented in this chapter demonstrates how client-side project managers progress their projects through a defined Knowledge Funnel while adopting an action-as-planning approach.

This chapter also presents the discovery of ‘Optioneering’, which is a tool used by client-side project managers for managing paradoxes within Construction projects. This chapter highlights how the ‘lived experience’ of client-side project managers challenges the traditional ‘plan and control’ view of project management.

The themes outlined in this chapter that are relevant to this thesis are:

- (i) Paradoxes (Dualities) exist within the ‘lived experience’ of client-side project managers.
- (ii) Demonstrating that client-side project managers adopt Design Thinking to manage paradoxes within Construction projects.
- (iii) An introduction of the Design Thinking Knowledge Funnel into the client-side project management body of literature.

1.4.8 Chapter 8

Chapter 8 presents an empirical paper “*The client-side project manager: A practitioner of Design Thinking*” which is currently in publication by Project Management Research and Practice (Jan-Jun 2019) This chapter investigates, in more depth, the use of Design Thinking by client-side project managers. This chapter examines the ‘lived experience’ of client-side project managers by applying a detailed framework of Design Thinking Mentalities, Thinking Styles, Practices and Tools which was synthesized from the existing Design Thinking literature.

The findings outlined in this chapter demonstrate that client-side project managers regularly adopt Design Thinking when managing Construction projects. This suggests client-side project managers are required to undertake the role of ‘problem-framers and solvers’, rather than just project ‘implementers’.

The themes outlined in this chapter that are relevant to this thesis are:

- (i) Design Thinking Mentalities, Thinking Styles and Practices;
- (ii) The identification of 15 tools that client-side project managers use in the delivery of their projects which align with Tools outlined in the Design Thinking literature.

1.4.9 Chapter 9

Chapter 9 presents an empirical paper that is current under review by the *International Journal of Managing Projects in Business*. This chapter uses a network lens to explore how client-side project managers create value through project work. This chapter explores how client-side project managers act in the role of System Specialists to develop network Construct and Controls, and to create Confidence that the project can achieve the required Functionality and Representation of Value required by the network actors.

This chapter demonstrates that client-side project managers are integral in developing the Structural, Relational and Cognitive Dimensions necessary to create a network Construct. In

addition, this demonstrates that client-side project managers create the Strategic, Implementation and Fine-tuning Controls necessary to guide and manage their projects towards the required outcomes.

This chapter outlines the discovery of a phenomena termed the Nested Project Management Knowledge Funnel and its associated Confidence Locks and outlines how client-side project managers develop the Construct, Controls and confidence necessary to create value through their projects.

The themes outlined in this chapter that are relevant to this thesis are

- (i) Client-side project managers create value by managing complex networks;
- (ii) Client-side project managers act as System Specialists to develop the Construct, Controls and Confidence required to create value in highly complex networks;
- (iii) Client-side project managers create value by adopting the Nested Project Management Knowledge Funnel framework; and
- (iv) Confidence Locks exist within the Nested Project Management Funnel and client-side project managers must acquire the confidence of decision makers so that these locks can be released and the project can progress to the next stage of the Nested Project Management Knowledge Funnel.

1.4.10 Chapter 10

Chapter 10 consolidates the contributions of the preceding chapters by grouping them into four main themes. Firstly, this chapter highlights how this thesis challenges the dominant ideas regarding the practice of client-side project management as presented in the current project management literature. Secondly, this chapter discusses some of the dualities that exist within the client-side project management experience and explains why these are important to the development of the discipline's theory and practice. Next, this chapter reviews the practices and tools that have been developed through the original research

outlined in this thesis and explains how client-side project managers can adopt these to enhance their skills. Finally, this chapter demonstrates how this thesis begins to shift the focus of client-side project managers from project creation to value creation through the creation of Constructs, Controls and Confidence.

1.4.11 Chapter 11

Chapter 11 provides a summary of the contributions made by this thesis to the client-side project management body of knowledge. It explicitly outlines the implications that these contributions have for client-side project management researchers and practitioners. This chapter also presents the limitations of this thesis as well as highlighting a number of opportunities for future research. Finally, it presents some final remarks regarding the importance of the research outlined in this thesis and the need for further exploration of new and novel perspectives, paradigms, approaches and models to continue the development of the discipline of client-side project management.

1.5 Research Design and Methodology

As previously noted, this thesis presents the findings from thirteen research papers that are published in international, peer-reviewed journals; presented at international and domestic project management conferences; or published in industry journals over the period of my candidacy. Seven of these peer-reviewed articles were selected for inclusion in this thesis and are presented as Chapters 3 through to 9.

Due to the word limit constraints of journal and conference publications, the research methodology cannot always be presented in the detail necessary for the readers to fully follow the research design and methodology.

The information presented in this section of the thesis is included to address this particular shortcoming by providing a holistic understanding of the research framework for the thesis, as well as providing additional information to augment the research methodology for each of the papers presented in Chapters 3 through to 9.

1.5.1 Research Aims

Based on my experience as a client-side project management practitioner, I perceived gaps between the extant project management body of theory and the practice of client-side project management within the Australian Construction Sector.

Prior to this thesis there has been relatively little empirical research conducted into client-side project management (Walker and Lloyd-Walker, 2014). Most of the literature regarding client-side project management has been in the form of non-peer reviewed industry journals (Godbold, 2016), while the actual practice of client side project management is often based on tacit knowledge which is transferred from practitioner to practitioner by mostly ad-hoc means (Helal, 2017).

Thus, the aim of this research is to explore the role of the client-side project manager in order to better understand its practice within the Australian Construction Sector.

1.5.2 Theoretical Framework

The theoretical framework of a research study provides both its vision and its structure (Grant and Osanloo, 2014). The theoretical framework outlines the philosophical, methodological and analytical basis for the research and demonstrates how this is guided by established formal theory (Grant and Osanloo, 2014, Eisenhart, 1991). Lysaght (2011) notes that “... *a researcher’s choice of framework is not arbitrary but reflects important personal beliefs and understandings about the nature of knowledge, how it exists (in a metaphorical sense) in relation to the observer, and the possible roles to be adopted, and tools to be employed by the researcher in his/her work...*” (p. 572).

Mertens (2014) asserts that the theoretical framework has “...*implications for every decision made in the research process...*” (p. 3) and as such it must be clearly and explicitly identified at the inception of the research. While I agree with Merten’s (2014) comments in relation to the importance of the theoretical framework, I disagree with her conclusions because I believe it negates the impact that the research process itself may have on the researcher.

My personal experience in undertaking this research was that the process changed my philosophical worldview. I found that I completed the research with a different understanding of reality, how it is constructed and how it could be measured to that which I understood when I commenced the research process. My experience, therefore, is more aligned with the statements by Grant and Osanloo (2014) who note that “...a theoretical framework may also [be developed]... in the course of the dissertation study...[and for qualitative research] the theoretical framework often emerges in the data analysis phase” (p. 16)

1.5.2.1 Philosophical Positioning

All researchers commence their studies with a particular philosophic position (Edson, 2012). This philosophic position is comprised of their belief regarding of the nature of reality (i.e. their ontological position) and their belief regarding how that reality can be known (i.e. their epistemological position) (Anderson and Baym, 2004, Hansen, 2004). These beliefs guide, either consciously or unconsciously, the research methodology (i.e. the logic process they will use) and research methods (i.e. the specific techniques) they will adopt for their research (Reybold, 2002, Nicholas and Hathcoat, 2014). Figure 1-2 provides a graphical representation of how a researcher’s philosophical positioning impacts their research.

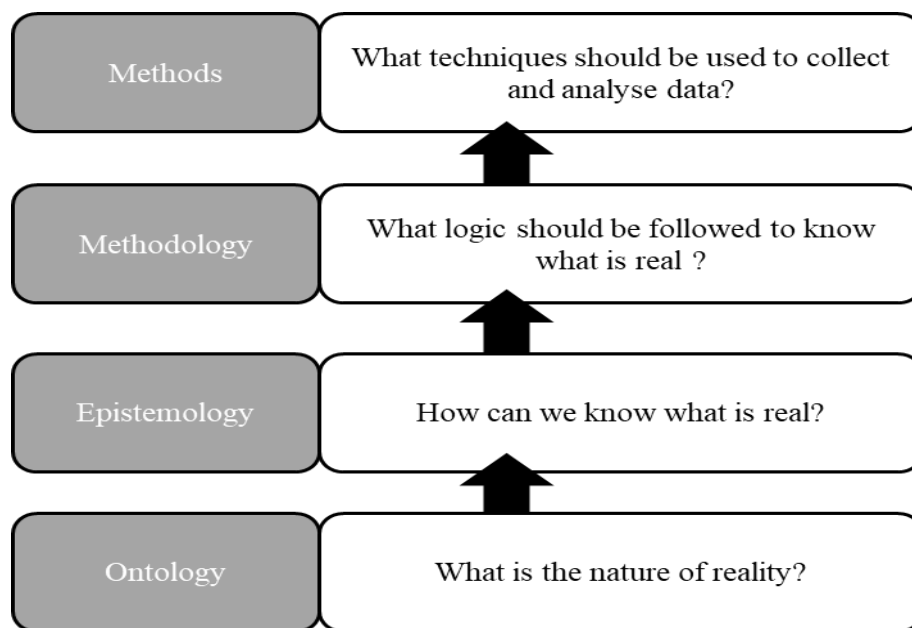


Figure 1-2: The Impact of Philosophical Positioning on Research

The foundation of a researcher's philosophical position is their understanding of the nature of reality, in other words their ontological position. Ontology is a branch of metaphysics that aims to understand the structure of reality by defining the nature of the relationship between the subject or the object, or between the knower and the known (Nicholas and Hathcoat, 2014). It is widely accepted that a researcher's ontological position will fall somewhere on a continuum that spans from Realism to Constructivism (Scott et al., 1995, Young, 2007, Gale, 1993, Morgan and Smircich, 1980, Mehrotra, 2010).

The Realist believes that the reality is based on a set of absolute and universal truths which allow it to be distinguished from mere belief (Anderson and Baym, 2004). For the Realist, reality is singular and reductionist and can therefore be explained through a single body of knowledge consisting of a limited set of 'true' statements (Shapiro, 2002). For the Realist, reality exists external to the observer and can be known because it is either self-evident or able to be deduced through objective observation (Anderson and Baym, 2004).

In contrast, the Constructionist believes that realities are created by social actors (Rosen and Kuehlwein, 1996) at either individual or social level (McNamee and Shawver, 2004, Edley, 2001). In other words, phenomena are only as real as the meanings that we associate with them (Nicholas and Hathcoat, 2014). For the Constructivist, there are as many realities as there are perceptions of a phenomena. As such, reality is a subjective construct that does not exist external to the observer (Tashakkori and Teddlie, 2010). Constructivism views reality as a pluralistic, multifaceted and multilayered construct in which perceptions can overlap and even appear to be in conflict (Ang, 2018). As a result 'reality' can only begin to be understood when all perspectives are taken into account.

Debate over whether Realism and Constructivism is the 'proper' basis for scientific research has raged for decades, with each camp attempting to gain supremacy (Järvensivu and Törnroos, 2010). Those in the Realist camp argue that, taken to its extremes, Constructivism creates a philosophical position in which human beings can never have certainty about any knowledge that exists outside their own minds – a philosophical position known as solipsism (Hansen, 2004). In response, those in the Constructivist camp criticise Realists for both accepting the validity of Heisenberg's uncertainty principle (1958) which dictates that measurement of a phenomena changes the phenomena itself, and then ignoring the

implications this has for the Realist ontology, insomuch as the methods selected for testing a phenomena are subjectively chosen by the researcher and therefore the results obtained must infer an element of subjectivity which ultimately disproves their claims of objectivity (Hansen, 2004, Cupchik and Gebotys, 1988).

Purists from both camps continue to argue that there is no sustainable middle ground between the two ontological extremes. Smith and Heshusius (1986) have vehemently argued that “...*the claim of compatibility, let alone synthesis [of realist and constructivist ontologies], cannot be sustained...*” (p.4). While Lincoln and Guba (1985) argue that the foundational beliefs of both ontologies are so diametrically opposed that there can never be a reconciliation of these perspectives.

However, there is a growing number of researchers who believe that ‘reality’ may fall somewhere in the middle of the ontological continuum. As Cupchik and Gebotys (1988) so adeptly argue “...*wisdom dictates that the two domains interact...In short, the boundaries between 'outside' and 'inside; are illusory and predicate a dichotomy between external physical objects and correlated sensory knowledge: a distinction that does not readily generalise to a social world of hearts and minds...*” (p.4). This perspective dictates that other ‘ontological clusters’ occur along continuum (Anderson and Baym, 2004). These range from ‘critical realism’ which believes that although there is one reality, there are specific, local truths through which this reality can be comprehended (Järvensivu and Törnroos, 2010) through to ‘moderate constructivism’ which believes that the specific local truths are necessary for understanding reality, but it is possible that all these truths are actually describing one single, external reality (Lincoln et al., 2011).

This thesis adopts a moderate constructionist ontology. The reason the research has adopted a moderate constructivist ontology in lieu of a critical realist ontology, is due to the arguments formed by Järvensivu and Törnroos (2010) in which they suggest that this is the ontological position adopted by explorative research that attempts to discover “...*multiple constructed, community bounded realities...*” (p.100). As this thesis aims to explore the role of client-side project managers in the Australian Construction sector, I believe it is based on a moderate constructivist ontology.

A researcher's ontological position will impact their epistemological position. As Anderson and Baym (2004) highlight "...*inseparable from our understanding of reality are the assumptions that shape any effort to comprehend phenomena...*" (p.604). Therefore, just as there is a continuum of ontological belief there is also a continuum of epistemological belief. Anderson and Baym (2004) suggest that the epistemological continuum is similar, but not identical to the ontological continuum, comprising of only three broad schools of thought – Positivism, Post-positivism and Interpretivism.

A Positivist epistemology is closely linked with a Realist ontology. Weed (2009) explains that the Positivist epistemology assumes direct and repeated measurement of a phenomena over time is possible. Hence, the phenomena under investigation remains constant and must therefore belong to a single, external reality that does not change (Weed, 2009). Positivism measures truth against criteria of validity, reliability and objectivity (Drost, 2011, Straub et al., 2004).

The Interpretivist epistemology resides at the other end of the spectrum and is closely linked with a Constructivist ontology. An Interpretivist epistemology assumes that an understanding of reality can only be formed through an analysis of multiple, subjective accounts of a phenomenon (Järvensivu and Törnroos, 2010) and through these a collective 'truth' can be discovered (Onwuegbuzie, 2002). Interpretivism rejects the criteria of validity, reliability and objectivity as the basis for truth, and instead claims that trustworthiness of data and analysis is all that matters (Longino, 2002). Järvensivu and Törnroos (2010) suggest that these claims of trustworthiness are assessed according to whether:

- "...(i) *the claims are supported by data;*
- (ii) *The claims, data and chain of arguments linking them together are acceptable to the scientific community in light of critical reasoning and background assumptions; and*
- (iii) *The community determines its validity is characterised by observance of the norms of criticism, the update of criticism, public standards and the equality of the community participants...*"

(p. 102)

Between Positivism and Interpretivism lies the epistemological position termed ‘Post-positivism’ (Mehrotra, 2010). Post-positivism espouses that reality is constructed and influenced by the researcher (i.e. internal reality), but at the same time there exists a reasonably stable relationship among social phenomena (i.e. external reality) (Onwuegbuzie, 2002). Anderson and Baym (2004) suggest that Post-positivism spans a range of ontological positions from critical realism to moderate constructivism. Post-positivism accepts the criteria of validity and reliability as the criteria for assessing truth, however it maintains that these criteria are achieved through (i) Continual testing and re-testing of the theoretical interpretations of any research findings; (ii) an open communicative process with the scientific community; and (iii) ensuring that any research findings produces the desired results when put into action (Kvale, 1995). The research presented in this thesis adopts a post-positivist epistemology.

Figure 1-3 provides a graphic representation of the philosophical position of this thesis.

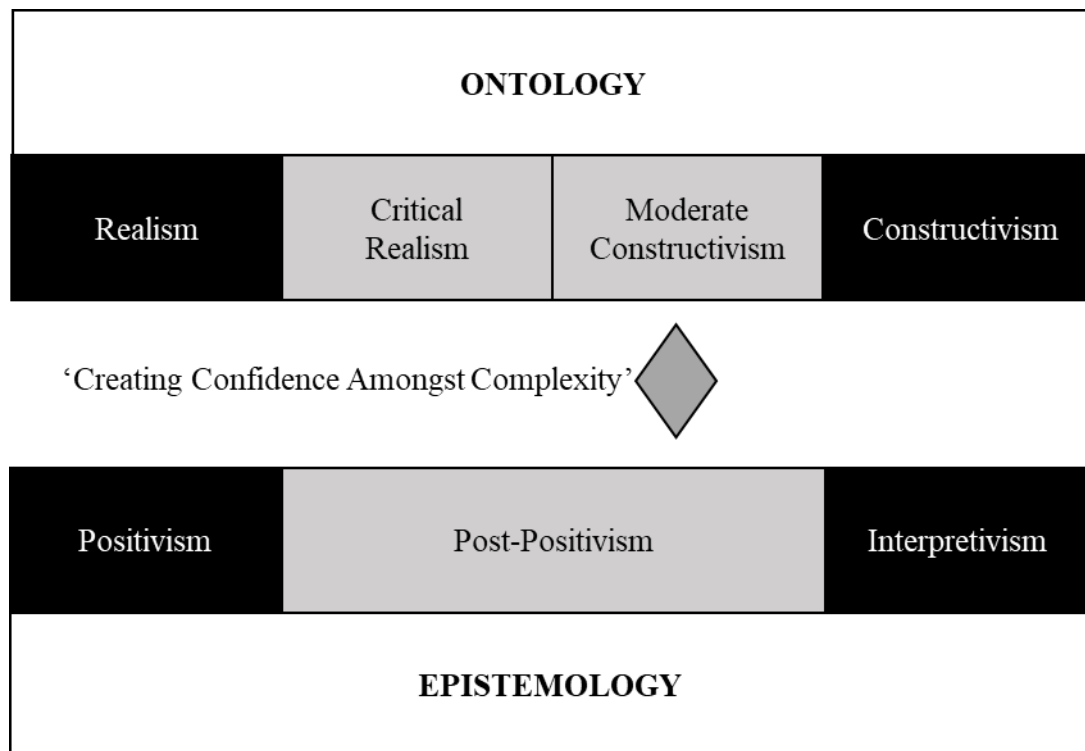


Figure 1-3: Philosophical Position (Ontology and Epistemology) of this Thesis

1.5.2.2 Research Methodology selection

When investigating the best research methodology for this research project I considered the work of Milliken (2010) who argued that : (i) Qualitative research methodologies are best suited for exploratory research projects; and (ii) A Grounded Theory methodology is best suited for research projects which are conducted in areas that have little prior empirical research. As the aims of this research is to explore the role of client-side project managers in the Australian Construction Sector, an area in which is little prior empirical research, a qualitative, Grounded Theory methodology was selected.

In addition, Milliken (2010) argues that a Grounded Theory is well suited to research that explores social practices because it allows the researcher to ‘discover’ new concepts and identify relationships that exist between these concepts as the emerge from the data.

Locke (2003) notes that the most distinctive feature of a Grounded Theory methodology is its commitment to “...*research and ‘discovery’ through direct contact with the social world studied, coupled with a rejection of prior theorizing...*” (p. 4). The rationale for rejecting prior theorizing is that it may bring preconceived constructs to the research which will, in turn, obstruct the process of theory development by tainting the researcher’s view of the data (Glaser and Strauss, 1967).

As predicted by Strauss and Corbin (1990), Grounded Theory methodology has become more ‘fashionable’ in qualitative research projects over the past three decades. However, Weed (2009) argues that this increase in the ‘use’ of Grounded Theory is simply a result of researchers attempting to claim legitimacy for their inductive research rather than applying a true Grounded Research methodology. Weed (2009) insists that for a Grounded Theory methodology to be able to ensure macro and micro-level research quality, it must be applied as a ‘package’ and not a ‘pick a box’ of ideas. Furthermore this package must include the following eight elements:

- (i) ***An iterative process*** of simultaneous data collection and analysis, in which data is gathered, analysed, coded, refined and reanalysed against an ever-widening body of literature (Bryant and Charmaz, 2007);

- (ii) ***Theoretical Sampling*** which is identified through data analysis and intended to refine and develop concepts and linkages, not to increase the size of the original sample (Charmaz, 2006);
- (iii) ***Theoretical Sensitivity*** of the area under investigation. This represents the ‘point of departure’ (Charmaz, 2017) to develop the research methods, understand the data and to think achieve relevance during the analysis process;
- (iv) ***Codes, memos and Concepts*** which allows the researcher to ‘discover’ and develop new concepts through a critical and reflexive review of the data. In this process the researcher attempts to (a) describe the phenomena; then (b) conceptualise the phenomena; and finally (c) develop their theory about the phenomena. (Dey, 2007);
- (v) ***Constant Comparison***, firstly of data against other data, then codes against codes, concepts against concepts and finally between the codes, concepts against both the data and the literature. Weed (2009) explains that it is the process of constant comparison that ensures emergent concepts remain grounded in theory;
- (vi) ***Theoretical Saturation***, which is obtained when the data gathered no longer sparks new insights or extends the ‘discovered’ concepts (Charmaz, 2006). Glaser (2001) notes that achieving Theoretical Saturation ensures “... *the generated grounded theory ...[has] conceptual density...[and] theoretical completeness...*” (p.191).
- (vii) ***Fit, Work, Relevance and Modifiability***: Milliken (2010) argues that judging qualitative research by positivist standards such as ‘validity’ and ‘reliability’ is both inappropriate and ultimately self-defeating. Instead Milliken (2010) argues that qualitative methodologies, such as Grounded Theory must be assessed by their Fit, Work, Relevance and Modifiability. Grounded Theory ‘Fit’ relates to how closely the theory describes the phenomena it is exploring and is achieved through the constant comparison and theoretical saturation (Weed, 2009). A Grounded Theory ‘works’ if it can provide empirically based explanations for the

phenomena to which it refers (Wastell, 2001). It is said to have ‘relevance’ if the social actors involved in the phenomena can use the theory to address real-world concerns and challenges (Weed, 2009). Finally, although the research is complete at the time the theory is applied, Grounded Theory is always contextual and temporal, as such it must have modifiability to allow it to be adapted to new conditions (Mills et al., 2006); and

- (viii) *Substantive Theory*, rather than a generalizable theory, must be generated. This theory may be ‘modified’ across multiple contexts and potentially can be developed into a generalizable theory as other substantive theories in the same area of research are linked (Glaser, 2014, Glaser and Strauss, 1967).

1.5.3 Research Methods

In this section I will detail the research methods used in this thesis. As previously noted, many of the chapters in this thesis are published research articles. As such there is unavoidable repetition as readers from different journals are introduced, or reintroduced to the research. However, due to the word constraints placed on journal articles, it was not always possible to provide the readers with a comprehensive understanding of the research methods utilized. It is hoped that this section will assist in providing more holistic understanding of the thesis research process.

1.5.3.1 Theoretical sensitization

The research for this thesis began with a wide-ranging literature review. This literature review started with ‘traditional’ project management theory, strategic management and production management bodies of theory. Despite my experience as a project management practitioner I felt it was important to my research to refamiliarize myself with the theoretical concepts underpinning the profession, as well as any new academic literature that had been published since I had last attended University.

Arguably the most influential article for this thesis which was reviewed during this time was the work of Koskela and Howell (2008). This article questions the theoretical foundation of

project management and argues against the traditionally accepted perspective that project management is a sub-set of production management.

This article became seminal to the questioning, framing and thinking that would guide the remainder of my research. In particular, the idea of challenging the theoretical foundation of project management was the basis for Chapter 3 of this thesis and provided the framework for the interviews which would form the ‘progenitor data’ for the remainder of this thesis.

I have coined the term ‘progenitor data’ to describe the data collected following the publication of Chapter 3 but before the rest of the thesis chapters were written. I use this term because all the research-based chapters in this thesis after Chapter 3 are either directly, or indirectly, born from this data.

As Glaser (2014) and Milliken (2010) note, the Grounded Theory research method is a recursive and reiterative process that develops over time. This is foundational to the process as it allows the researcher both time and space to identify, formulate and test relationships that exist between their data and existing theory (Franco, 2005). The research adopted in this thesis moved through this recursive process, returning repeatedly to the ‘progenitor data’ as new concepts emerged throughout the research process. For me, the following four aspects were critical in the development of this thesis:

- (i) The literature review continued throughout the entire research process. This continued immersion in the literature was fundamental to the development the research methodology as new concepts had to be explored in the literature as they emerged from the research data;
- (ii) The discovery of the work of Koskela and Howell (2008) which led to my exposure to the 5 stages of Transformation Production Management and the possibilities of dualities within the client-side project management ‘lived experience’. The 5 stages of Transformation Production Management provided the framework for the interviews which would produce the ‘progenitor data’, and from which all other concepts investigated through this thesis would originate;

- (iii) The 'progenitor data' provided a rich source for the development of new research avenues. Some of these were pursued through additional data collection (Chapters 4,5 and 6) while others were developed through the application of new and novel 'lenses' which provided opportunities to see the 'progenitor data' from new perspectives (Chapters 7,8 and 9); and
- (iv) All Grounded Theory research methodology is a combination of both planned and emergent research design (Wastell, 2001, Strauss and Corbin, 1990). One particular outcome of this is that data that was gathered for one aspect of the research also provides an opportunity to augment other aspects of the research, particularly the data analysis. This planned/emergent research design process is evidenced in this thesis in the way the existing data is regularly reviewed for new concepts and themes which then form the basis for additional research in subsequent chapters. Examples of this include the additional data collected for Chapter 4 being available for re-analysis with a new 'lens' in Chapter 9, and the case studies in Chapter 5 being available for a re-analysis using a new 'lens' in Chapter 6.

Figure 1-4 provides a diagrammatic representation of the research methodology applied to this thesis.

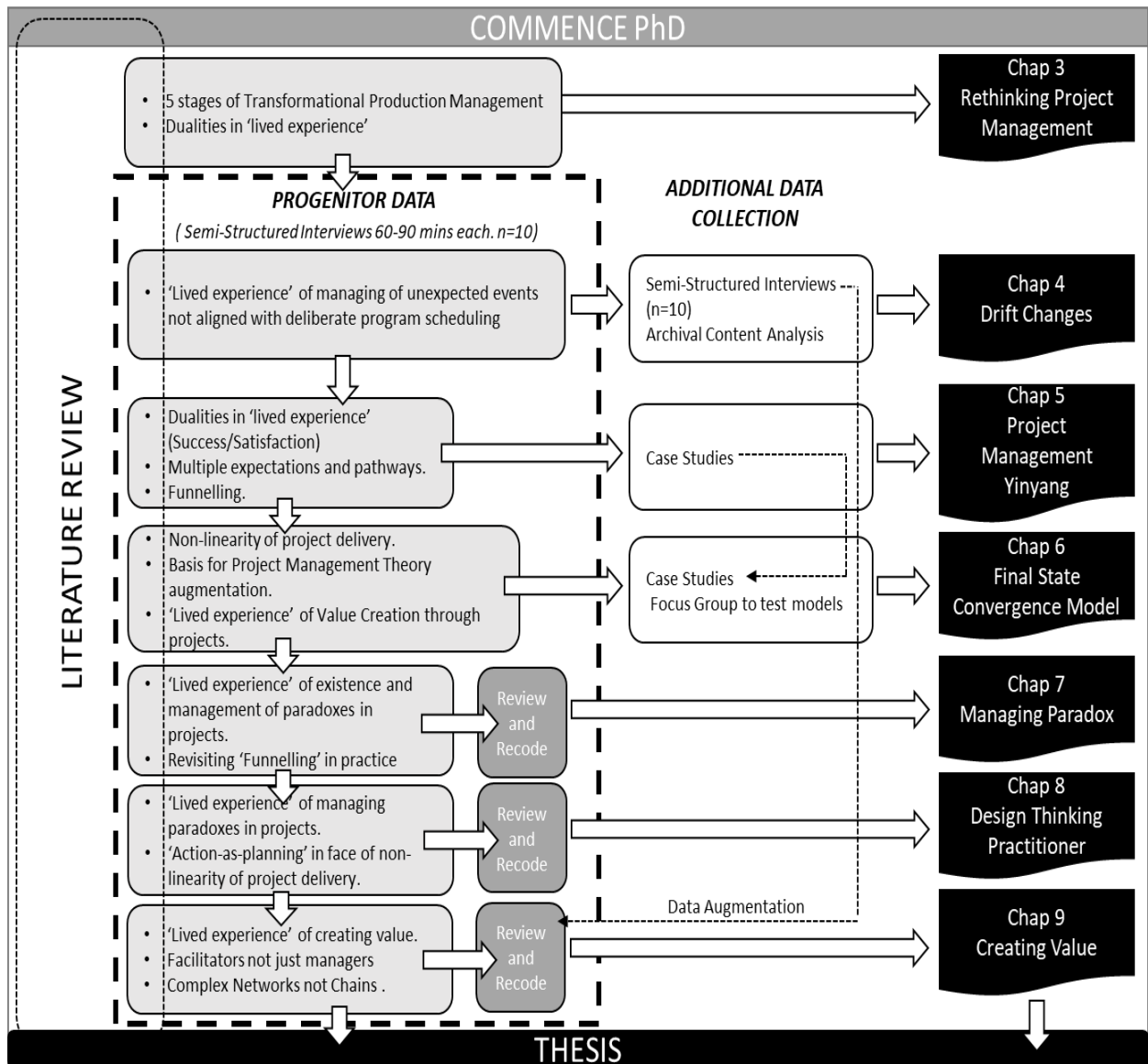


Figure 1-4: Thesis Research Methodology

Due to the recursive and emergent nature of this thesis, it may be difficult for the reader to gain a holistic appreciation for the research conducted. To assist, the combined research for this thesis is provided in Table 1-2:

Table 1-2: Summary of Thesis Research

Research type	Details	Outcome
Interviews	n=10 Total interview time 11 hours 36 mins	Progenitor data Chapters 4 - 9
Interviews	n = 10 Total interview time 4 hours 43 mins	Chapter 4
Archival	69 Monthly Project Reports	
Content Analysis	5 Lessons Learnt Registers 2 Post Occupancy Evaluation Reports 3 Project Finalisation Meeting Minutes	
Case Studies	2 historical case studies	Chapters 5, 6
Focus Group	7 participants Recorded focus group session.	Chapter 6

1.5.3.2 Chapter 3

1.5.3.2.1 Theoretical Framework

In Chapter 3 of this thesis, a published article is presented. This was the first article I prepared for peer-reviewed publication. In this paper I state:

“...This research is approached using an objectivist ontology and a positivist epistemology...” (p.8)

Upon reflection, and in preparation for the presentation of this thesis, I now believe that this statement is incorrect. The research conducted for this paper was aimed at assessing the validity of the production management body of theory as a theoretical foundation for project management.

To achieve this, the research identified and tested themes and concepts against observed phenomena drawn from the ‘lived experience’ of client-side project managers. In my revised opinion, conducting an analysis against these observed phenomena dictated that the research adopted an interpretivist ontology and a pragmatic epistemology.

1.5.3.2.2 Research Aims

The purpose of the research conducted in Chapter 3 was to assess the validity of production management body of theory as a theoretical foundation for client-side project management.

1.5.3.2.3 Research Methodology

The research aims were achieved by undertaking two forms of comparative analysis using a process similar to the that outlined by Aronson (1994). The first comparative analysis was a thematic analysis in which two bodies of theory were reviewed with commonalities and differences noted within a predefined framework. The second comparative analysis reviews these two bodies of theory against a range of phenomena observed in the ‘lived experience’ of client-side project management, within the predefined framework.

The first body of theory was production management. This was selected because it had previously been identified as the traditionally accepted basis for project management (Koskela, 1999).

This body of theory was selected because of the similarities that exist between strategic management and project management. Specifically, that both:

- (i) Are processes which result in the creation of unique outcomes for the purpose of gaining a commercial advantage (Tse and Olsen, 1999, Hitt et al., 2011, Project Management Institute (U.S.), 2013);
- (ii) Work in variable time scales that can create dynamism in the delivery (Altshuler and Luberoff, 2003, Acur and Englyst, 2006, Ensign, 2008);

- (iii) Have similar life-cycles, commencing with the codification of intangible concepts into formal plans, and through to the implementation of these plans (Schaap, 2012, Mintzberg, 1994, Ingason and Jónasson, 2009);
- (iv) Are required to deliver outcomes in complex and dynamic environments (Bracker, 1980, Ives, 2005a); and
- (v) Require practitioners to operate as generalists rather than specialists (Steiner and Miner, 1972) and have the ability to identify and assess opportunities and threats in real-time (Muralidharan, 1997).

The pre-defined framework emerged from the literature review as the underlying assumptions were identified. This framework was the 5 stages of production/strategic management. Specifically, the process of Needs Identification, Inputs, Process, Outputs, and Client Satisfaction.

With the framework created and the first comparative analysis complete, the second analysis commenced. This analysis compared the underlying assumptions of both bodies of theory to be tested against 15 phenomena from the field of client-side project management. These phenomena were personal experience resulting from 15 years as a client-side project management practitioner. These phenomena were categorized according to predefined framework in order to facilitate the data analysis process.

1.5.3.2.4 Data Analysis

In the first comparative analysis, the underlying principles of both production management and strategic management were categorised according to the 5 components of the framework. This allowed both commonalities and differences to be easily recognized.

In the second comparative analysis, each of the phenomena were assessed against the underlying assumptions of either production or strategic management. This was achieved through the application of a simple binary matrix to determine which of the underlying assumptions of both bodies of theory supported the phenomena.

1.5.3.3 The ‘progenitor data’

1.5.3.3.1 Research Aims

This research was designed to collect and analysis wide-ranging data about the ‘lived experience’ of client-side project management. Its purpose was two-fold:

- (i) To identify if/how client-side project management differed from other forms of project management (e.g. Contractor-side project management; and
- (ii) To explore the nuances of the client-side project management ‘lived-experience’.

1.5.3.3.2 Research Methodology

Theoretical sensitivity for this research was obtained through my practical experience in the field of client-side project management in the Australian Construction Sector, through observations of other practitioners and through a review of the project management, strategic management and production management bodies of literature. This allowed me to enter my field of research with an ‘open mind, but not an empty head’ (Calman, 2006, Charmaz, 2017).

The formal research process commenced with an application to the University of Southern Queensland’s ethics committee. This application included a detailed overview of the research aims and proposed data collection and analysis procedures. As part of this application auxiliary documents were prepared. These included:

- (i) An information sheet to be issued as part of the invitation to research participants, which outlined the research aims, data collection and analysis processes, the anticipated benefits of the research, the possible risks associated in being involved in the research, procedure for withdrawing from the research after it had commenced and the privacy protocols which would guide the research;
- (ii) The invitation email which would be sent to potential research participants; and

- (iii) A document to be completed by all research participants which acknowledge they gave informed consent to participate in the research.

Once research approval was received from the University's ethics committee the data collection and analysis process began.

Data was collected through semi-structured, personal interviews with a purposively selected sample (i.e. practicing client-side project managers). These interviews were developed around the 5 stages of production/strategic management framework established for Chapter 3.

In order to gain access to the purposely selected sample, a client-side project management company ('ABC Projects') was approached. At the time ABC Projects had a staff of 85 full-time, client-side project management practitioners. ABC Projects has offices in every Australia capital city, with the exception of Adelaide and Hobart. They also have regional offices in Newcastle and Townsville.

ABC Projects only manage 'facilities' construction projects and do not deliver infrastructure or IT projects. Their client base is predominately Federal or State departments, agencies or authorities (83% by revenue), with the remainder of their work deriving from publicly listed entities and large private developers.

In order to obtain access to research participants, discussion were conducted with the Directors of ABC Projects. These discussions outlined the purpose, proposed outcomes and potential benefits of the research project, and resulted in the development of a Research Agreement ('RA') which explicitly outlined the research protocols. The RA was subsequently endorsed by the Directors of ABC Projects and access was granted to the email addresses of all ABC Project employees for the purpose of inviting them to participate in the research. In addition, the RA made provision for access to a range of project information that may be requested for future research projects associated with the overall PhD research project. This 'in principle' agreement to allow access to additional project information and to call for research participants to be involved in future, as-yet-undefined, research became critical to the successful completion of this thesis.

Invitations to participate in the research was emailed to all 85 employees. 25 responses were received, with 10 of these accepting the invitation to participate in the research.

1.5.3.3.3 Data collection

The ‘progenitor data’ was collected through personal, semi-structured interviews. The research participants were provided with a copy of the interview questions two weeks prior to their interviews to allow them to consider their responses.

The interviews were designed to allow each participant to speak freely about their role, practices and experiences as client-side project managers. The interviews were presented as a range of questions grouped into 5 categories (i.e. Client Needs, Inputs, Process, Outputs and Satisfaction) with additional questions designed to obtain demographic data about the participants and their perspective on how, if at all, they felt client-side project management differed to other forms of project management.

The interviews were digitally recorded and transcribed into Nvivo for data analysis. The recordings, transcripts, and associated data analysis are retained on a password-protected computer. To ensure their privacy the interview participants were given individual designators during the transcription process (PM01-PM10).

1.5.3.3.4 Data Analysis

The ‘progenitor data’ was analysed using a multilevel analysis similar to the process outlined by Edson (2012). The data collected was first subjected to a process of open coding like that outlined by Algeo (2012). The data was reviewed and coded with no consideration for any theory that might be associated with particular themes. During this process, the data were constantly compared to each other to moderate the coding. During the initial open coding process, the memo-ing process noted by Flipp (2014) was utilised to begin to map out potential relationships. This process continued through the first pass of the data until a saturation point was established (Edson, 2012). This first level of analysis generated 46 unique themes (codes).

The second phase of the data analysis process was axial coding (Wastell, 2001). This process involved thematically sorting the codes into categories (Calgren, 2013, Strauss and Corbin, 1990). Through this process seven categories emerged. The axial coding process also included a more formal relationship mapping process between the categories. The categories were analysed in order to understand what were the core processes described in the data and how they might all ‘fit’ together in terms of causal conditions, consequences and connections (Flipp, 2014)

The final process of the data analysis was selective coding. This was undertaken following Flipp (2014) recommendation that the researcher use the categories which have emerged from the data to propose an explanation of how the core processes identified might work together. The result of this process was the development of research outlines which would later become Chapters 4,5 and 6 of this thesis.

1.5.3.4 Chapter 4

1.5.3.4.1 Research Aims

The purpose of the research conducted in Chapter 4 was to explore the management of unexpected events by client-side project managers.

1.5.3.4.2 Research Methodology

This research adopted a Grounded Theory methodology. The research aims were achieved through personal, semi-structured, personal interviews with a purposively selected sample and through the analysis of 69 monthly project reports. The application of two data collection and analysis processes is recommended by Glaser and Strauss (1967) as a form of triangulation.

In their interviews the research participants were asked to provide an assessment of stakeholder satisfaction regarding their project’s final outcomes. The research participants were requested to provide formal evidence to validate their assessment. As a result, this study also reviewed five lessons learned reports, two post-occupancy evaluations, and three project finalization meeting minutes. It is important to note that these documents were used as

validation of the research participants personal assessment of stakeholder satisfaction, they were not, in themselves, the subject of analysis.

Operating within the protocols established in the RA, invitations to participate in the research was emailed to all 90 employees of ABC projects (the company had grown during the data analysis period of the progenitor research). 28 responses were received, with 10 of these accepting the invitation to participate in the research. None of the ten research participants were involved in the ‘progenitor data’ collection process, however many of them were working on the same projects as the original research participants.

1.5.3.4.3 Data collection

The data was collected through personal, semi-structured interviews. The research participants were provided with a copy of the interview questions two weeks prior to their interviews to allow them to consider their responses.

The interviews were designed to allow each participant to speak freely their experiences in project planning, managing the project plans, whether they encountered unexpected events, and if so, how they managed these events. The interviews were presented as 36 questions grouped into 3 categories which had been derived from Söderholm (2008) work (i.e. Fine-Tuning, Revisions and Re-openings) with additional questions designed to obtain demographic data about the participants.

The interviews were digitally recorded and transcribed into Nvivo for data analysis. To ensure their privacy the interview participants were given individual designators during the transcription process (PM01-PM10).

One of the closing questions in the interviews was a request for the research participants to provide archival content for projects that they felt had encountered unexpected events. As a result of this request 69 monthly project reports were provided to the researcher. These reports were given designators (MPR01-MPR69).

The recordings, transcripts, monthly reports and associated data analysis are retained on a password-protected computer.

1.5.3.4.4 Data Analysis

The interview data was analysed using the same multilevel analysis outlined in Section 1.5.3.3.4. This three-stage process of open, axial and selective coding produced a total of 9 codes (properties) consolidated into 4 categories (themes). The terms ‘properties’ and ‘themes’ was adopted for this publication (Chapter 4) at the request of the journal reviewers.

The archival data was analysed using a two-stage process of axial and selective coding. The open coding process was not required for the archival data analysis as it was completed as part of the interview data analysis process. The archival analysis process consisted of reviewing the data against the themes and properties already established (axial coding) and interpreting how these ‘fit’ together to explain the ‘lived experience’ of managing unexpected events (selective coding).

1.5.3.5 Chapter 5

1.5.3.5.1 Research Aims

The purpose of the research conducted in Chapter 5 was to explore the dualistic relationship that exists between success and satisfaction in the client-side project management ‘lived experience’..

1.5.3.5.2 Research Methodology

Research for this chapter was undertaken in accordance with the protocols established in the RA and was conducted in two phases.

Phase 1 commenced with the codification of a phenomenon observed by one of the authors who is a consulting project manager working in the Australian Construction industry. The phenomenon was that the completion of a seemingly successful project did not always result in the project participants feeling satisfied with the project outcomes. Based on this observation, it was postulated that the phenomenon was the result of project participants using different assessment perspectives in their evaluation of the project outcomes.

To explore the phenomenon, I purposively selected two recently completed projects as case studies. These case studies were specifically selected because they appeared to contain a clear demarcation between concepts of project success and client satisfaction. This targeted selection process is not unusual in a Grounded Theory methodology where the case studies (Patton, 1990). The two projects selected as the focus of the case studies, had recently been delivered by me as part of my role as the National General Manager of a project management firm. The rationale for this decision was that I knew both projects intimately and I had access to all the information necessary to create the case study. In addition, by selecting two projects that had been delivered by the same project manager (i.e. me) this process reduced variables that may have existed in the application of project management methodologies and the personal characteristics of the project manager.

An analysis of the cases identified four areas of commonality. These are outlined in Table 5-4. These four areas provided a coding framework for Phase II of the research.

Phase II of the research involved reviewing the ‘progenitor data’ using a multilevel analysis similar to the one outlined in Section 1.5.3.3.4. and the coding framework established in Phase I. This reassessment of the previously collected data (i.e. the ‘progenitor data’) is a core characteristic of Grounded Theory (Milliken, 2010) and fundamental to the theory development process (Franco, 2005).

1.5.3.5.3 Data Collection

The following data analysis processes were undertaken in each of the Phases:

Phase I:

The case studies were developed from existing project documentation. For both case studies these included the User Requirements Brief, design meeting minutes, project control group meeting minutes, monthly project reports, construct site meeting minutes and email correspondence. These documents were obtained from the existing project files on ABC Projects project drives.

Phase II:

The data collection for Phase II has already been detailed in Section 1.5.3.3.3.

1.5.3.5.4 Data Analysis

The following data analysis processes were undertaken in each of the Phases:

Phase I:

Phase I data analysis commenced with inductive category construction (Kuckartz, 2014). This was achieved by paraphrasing and abstracting the salient points within the cases. Once identified, these were subjected to a comparative thematic analysis (Tuckett, 2005) and consolidated into three generalized categories. These three categories became basis for the Phase II coding framework. The categories identified through the case study analysis are noted in Table 5-4.

Phase II:

Phase II was undertaken using a multilevel analysis similar to the one outlined in Section 1.5.3.3.4. This process resulted in the identification of four additional categories, which were added to those identified in the Phase I analysis. This brought the total number of identified categories to seven. These categories are noted in Table 5-5.

1.5.3.5 Chapter 6

1.5.3.6.1 Research Aims

The purpose of the research conducted in Chapter 6 was to develop a conceptual model from the transformational production management, strategic management and complexity bodies of theory to help explain the client-side project management ‘lived experience’.

1.5.3.6.2 Research Methodology

Research for this chapter was undertaken in accordance with the protocols established in the RA. This research adopted a Grounded Theory methodology. The research was undertaken in three stages.

- (i) Stage 1 was the development of an initial model based on personal experience obtained as a client-side project management in conjunction with a literature review;
- (ii) Stage 2 was testing this initial model against the case studies that had been developed in Chapter 5 and making any necessary adjustments to the model; and
- (iii) Stage 3 was the testing of the adjusted model with a focus group.

1.5.3.6.3 Data Collection

Stage 1 and 2

These stages of the research project incorporated data which had previously been collected (i.e. personal experience and the ‘progenitor data’).

Data collection for Stage 3 (Focus Group)

Invitations to participate in the focus group were emailed to all 23 of ABC Project’s staff in the Brisbane office using the template previously approved by the University of Southern Queensland ethics committee. I elected to only send the invitation to the staff in the Brisbane office so as to allow personal attendance at the focus group. At the time of conducting this research, ABC Projects did not have video conferencing capabilities.

Seven project professionals accepted the invitation. Each of the seven participants provided Informed Consent using the template previously approved by the University of Southern Queensland ethics committee.

Two weeks prior to the focus group session, each of the participant’s was issued with a pre-reading pack. This pack included a summary of the salient points of each of the three bodies of theory incorporated into the first version of the model. This information was developed from the information presented in the Chapter 3 findings with additional information regarding complexity theory.

I facilitated the focus group session. The focus group session was digitally recorded and transcribed into Nvivo for data analysis. The recordings, transcripts, and associated data

analysis are retained on a password-protected computer. To ensure their privacy the interview participants were given individual designators during the transcription process (PM01-PM07)

The focus group commenced with Powerpoint presentation outlining the purpose of the research, why I felt the development of a new conceptual model was necessary, a brief review of the three bodies of theory used to develop the model, and finally a presentation of the model itself.

The focus group took a total of 90 minutes to complete. The initial phase of the focus group (the Powerpoint presentation) took approximately 30 minutes with the remaining 60 minutes dedicated to a directed discussion.

In the directed discussion session, the focus group participants were asked the questions outlined in Section 6.11.6 of this thesis.

1.5.3.6.4 Data Analysis

The following data analysis processes were undertaken with for this research.

Stage 1:

The only analysis undertaken in this stage was reflection on personal experience and the literature, to develop the initial model prototype (Version 1). At this stage of the research, no formal analysis was undertaken.

Stage 2:

The model (Version 1) was tested against the case studies developed for Chapter 5. In order to test the model against the case studies a coding framework was developed. The framework was established based on the key elements necessary for the development of the conceptual model. These are outlined in Table 6-3.

The case studies were imported into Nvivo reanalysed using the coding framework previously established. This allowed me to identify any data within the case study that correlated with the key elements of the model and to identify these on the model (Refer

Figures 6-7 and 6-8). In addition, and perhaps more importantly, this analysis was able to identify some aspects of the cast studies which were not reflected in the model (Version 1).

Stage 3:

The transcripts of the focus group session was analysed in Nvivo. The data collected in Stage 3 was analysed using a multilevel analysis outlined in Section 1.5.3.3.4. This process identified four areas in which the model was deficient in relation to the ‘lived experience’ of the focus group participants. These four areas are outlined in Section 6.11.7.

1.5.3.5 Chapter 7

1.5.3.7.1 Research Aims

The purpose of the research conducted in Chapter 7 was to identify strategies that client-side project managers use to manage paradoxes in construction projects.

1.5.3.7.2 Research Methodology

This research used a Grounded Theory methodology and reviewed the ‘progenitor data’ through the lens of paradox theory.

1.5.3.7.3 Data Collection

The ‘progenitor data’ was collected in accordance with the process outlined in Section 1.5.3.3.3.

1.5.3.7.4 Data Analysis

The data was analysed in Nvivo using a multilevel analysis process similar to that outlined in Section 1.5.3.3.4. The open coding process identified sixteen concepts within the data. I was able to categorise these concepts into five themes.

Having established the concepts and themes directly from the ‘progenitor data’, I returned to the literature to find a theory which could provide a framework for defining a relationship

between these categories. This led me to the Design Thinking literature, which appear to be able to accommodate four of the five themes that had been identified. Using the Design Thinking theory as a framework, I re-categorized the data thereby linking the ‘progenitor data’ to an established body of theory.

1.5.3.5 Chapter 8

1.5.3.8.1 Research Aims

This research aims to explore the role of client-side project manager’s by investigating of they utilize Design Thinking when managing Construction projects.

1.5.3.8.2 Research Methodology

This research used a Grounded Theory methodology and reviewed the ‘progenitor data’ through the lens of Design Thinking. This lens was selected to further explore the some of the concepts identified in Chapter 7.

1.5.3.8.3 Data Collection

The ‘progenitor data’ was collected in accordance with the process outlined in Section 1.5.3.3.3

1.5.3.8.4 Data Analysis

The data was analysed in Nvivo using a multilevel analysis process similar to that outlined in Section 1.5.3.3.4, however the data had already gone through a process of open coding when it was reviewed in the research from Chapter 7. In addition, the literature review conducted for Chapter 7 identified the work of Hassi and Laakso (2011), Liedtka (2015) and Johansson-Sköldberg et al. (2013). Due to my familiarity with the ‘progenitor data’, I knew that many of the concepts outlined by these authors already existed within the existing pool of data – for this reason the open coding process was not formally undertaken.

In order to create categories for the data analysis I synthesized the work Hassi and Laakso (2011), Liedtka (2015) and Johansson-Sköldberg et al. (2013) into a single framework that provided a combination of Design Thinking Practices and Tools (Refer **Error! Reference source not found.**). The ‘progenitor data’ was then analysed using this framework as the basis for classification, thereby providing a theory-based process of selective coding.

A final stage of axial coding was utilized to identify relationships and linkages between the coded data. This was undertaken using memo-ing techniques.

1.5.3.5 Chapter 9

1.5.3.9.1 Research Aims

This research explores how client-side project managers create value through their role in the Construction process. For me, this final research chapter was important in order to provide some ‘real-world relevance’ for client-side project managers.

1.5.3.9.2 Research Methodology

This research used a Grounded Theory methodology and reviewed the ‘progenitor data’ and data collected in Chapter 4 through the lens of Value Creation Networks. This lens was selected to further explore the some of the concepts identified in Chapters 7 and 8.

1.5.3.9.3 Data Collection

The ‘progenitor’ data was collected in accordance with the process outlined in Section 1.5.3.3.3. The data pool was also augmented with the interview data obtained in Chapter 4 in accordance with the process outlined in Section 1.5.3.4.2.

1.5.3.9.4 Data Analysis

During my literature review for Chapters 7 and 8, I became aware of the body of work surrounding Value Creation Networks. Due to my familiarity with the progenitor and

augmented data, I was confident that many of the concepts discussed in this body of literature was also contained within the combined data pool that I had at my disposal.

The data was analysed in Nvivo using a multilevel analysis process similar to that outlined in Section 1.5.3.3.4, however the data had already gone through a process of open coding when it was reviewed in the research from Chapter 4, 7 and 8 so an open coding process was not undertaken. The Value Network literature provided a framework for selective coding, through the categories of the Network Construct, the Network Controls and the System Specialist. The final process of axial coding was conducted using a process of memoing, diagrams and sketching to represent the relationships and linkages between the established categories.

This process ensured that the results of the research remained grounded in existing theory – albeit from outside the traditionally accepted project management body of theory.

2 Background and Contiguous Literature

2.1 Background

Presented in this thesis are the research artefacts of my journey towards a deeper understanding of my professional role as a consultant client-side project manager. In essence, this thesis documents my quest for a greater understanding of how my profession adds value in the Construction process.

2.1.1 Why I needed to undertake this research.

My experience as a client-side project manager in the Australian Construction sector spans almost 20 years. During this time I have managed over \$2.0B (AUD) worth of facilities and infrastructure projects both in Australia and Papua New Guinea. I am currently the National General Manager of a client-side project management company employing 175 full time client-side project managers nationally. I have both Building Designer and Building licences and am a Certified Practicing Project Executive (CPPE) with the Australian Institute of Project Management. My current role requires me to deliver multi-million dollar projects nationally, manage a company generating in excess of \$65M in project management consultancy fees a year, and oversee the training and professional development of 175 client-side project managers. Yet, in spite of all of this, at the commencement of the research for this thesis I struggled to succinctly answer one of the first questions I'm often asked by any new client: "Why do I need a client-side project manager?"

Answering this question became a thorn in my mind that compelled me to undertake this doctoral research. I needed to be able to articulate clearly the value that a client-side project manager added to the Construction process. I knew, through my experience, *what* client-side project managers did. I also knew in a practical sense *how* we do it, because I practice these skills and teach them to others on almost a daily basis. But I didn't know *why* my clients needed client-side project managers. Prior to this thesis my response to the question consisted almost exclusively of anecdotal 'horror stories'. Stories about projects undertaken without a client-side project manager that resulted in failure. My examples included tales of huge cost

overruns, monumental project delays, and even a story about a client who became the defendant in a construction litigation case that ended up costing more than the construction project itself. However, although these stories often secured new jobs for my company, I still had a nagging suspicion that none of them truly answered the fundamental question of *why* my clients needed a client-side project manager.

However, having completed the research associated with this thesis I now have response that I am comfortable with: *“You need a client-side project manager because they create and manage the Construct, Controls and confidence necessary to ensure the strategic, technical, financial and human goals for your project are achieved”*.

The remainder of this thesis is devoted to explaining this response and the implications it has for client-side project managers. However, in the interest of providing enough context to follow the development of these ideas, I will provide some insight of what this answer means to me.

2.1.2 The client-side project manager

In most large or complex Construction projects there will be two types of project managers; the client-side project manager and the contractor-side project manager . Both of these types of project managers are interested in *what* needs to be built and *how* it needs to be built. However, in my opinion, it is only the client-side project manager who is interested in *why* the project needs to be built, and therein lies the major difference between their two types of approaches.

Because the client-side project manager is interested in the *why* of the project, they invest considerable time and effort at the front-end of the project. Often, years can pass before the contractor-side project manager becomes involved in the project. During that time the client-side project manager seeks to understand *why* the project is being undertaken through a range of in-depth stakeholder engagement methods such as workshops, focus groups, and face-to-face interviews with organisational stakeholders ranging from the most senior executives through to the most junior staff members.

Through these engagements the client-side project manager begins to understand the strategic drivers of the Sponsoring organisation. A client-side project manager will typically build rapport with significant User Groups within the organisation and start to develop a strong sense of the perceptions and expectations that these actors have regarding the project. These perceptions and expectations will include what these actors believe the completed project will achieve for their organisation, what these actors perceive will be the personal benefits they will gain once the project is completed, and often most importantly, what these actors want to gain professionally and emotionally by their involvement in the project delivery experience.

The client-side project manager gathers all this data together to understand *why* the project is being undertaken. They then use this data to create a Construct from which the required project outcomes will ultimately emerge. The Construct created by the client-side project manager needs to be robust enough to handle ontological duality. In other words, the Construct created must be able to define, manage and control both Positivist and Interpretivist paradigms.

2.1.3 The Construct

The Positivist paradigm of the Construct is created by providing clear definition and guidance about the physical development of the project. Throughout this thesis this is referred to as the project success aspect of the Construct. This aspect of the Construct is created by defining and articulating the project's time, cost and scope parameters. These project parameters are objectively measurable and, as such, they are easily recognisable and uniformly understood by all project stakeholders. As I will argue later in this thesis, the creation of the Positivist paradigm of the Construct requires client-side project managers to utilize certain technical skills and competencies to create pre-defined metrics that can be used to assess project success.

The Interpretivist paradigm of the Construct is created by managing the perceptions and expectations of the actors involved in the project. Throughout this thesis this is referred to as the client satisfaction aspect of the Construct. This aspect of the of the Construct requires the client-side project manager to understand, consolidate, converge and focus the project stakeholder's individual perceptions and expectations of the project so that they align as

closely as possible with the project's actual final outcomes. These perceptions and expectations are subjectively assessed and, as such, they are unique to each individual involved in the project. As I will argue later in this thesis, the creation of the Interpretivist paradigm of the *Construct* requires the *client-side project manager* to have highly developed interpersonal skills to create the environment necessary to achieve *client satisfaction*.

2.1.4 The Controls

As chapter 9 of this thesis will demonstrate, a client-side project manager creates and coordinates a complex network of actors, each with different expectations, technical expertise and perceptions of what the project will achieve. To manage this network, the client-side project manager adopts the role of a System Specialist. In this role they create and implement Strategic, Implementation and Fine-tuning Controls which are designed to simultaneously control the Positivist and Interpretivist aspects of the Construct.

The client-side project manager controls the Positivist paradigm of the Construct through the application of traditional project management skills, tools and competencies. These include the development of contracts and risk management tools, the assessment of progress against budget and program, and the assessment of scope against specifications, plans and other project documents.

The client-side project manager must also control the Interpretivist paradigm of the Construct. In many ways this is more difficult than controlling the Positivist paradigm because the expectations of the individual stakeholders involved in the project can vary significantly and these expectations can shift throughout the project. To control the Interpretivist paradigm of the Construct the client-side project manager uses tools such as regular project meetings and tailored reports, they also adopt Design Thinking tools such as 'visualisation', 'story-telling' and 'Journey-making'. The client-side project manager uses these tools, practices and techniques to consolidate disparate stakeholder expectations so that they will converge as closely as possible with the project's actual outcomes.

2.2 Contiguous Literature

Chapters 3-9 of this thesis will present papers which have either already been published or are currently under peer-review. Each of these chapters include literature reviews specific to the focus of the chapter. However, there are themes which are continually developed throughout this thesis. The purpose of the literature review presented in this chapter is to sensitize readers to these themes. These themes are:

- (i) Client-side project management;
- (ii) Rethinking Project Management; and
- (iii) Dualities, Pluralities and Functional Systems.

2.2.1 Client-side Project Management

This thesis focuses on a specific form of project management, called client-side project management. Previous to my research, existing scholarly research on this subject was limited. The only peer-reviewed research I found which was specifically focussed on client-side project management was the work by Walker and Lloyd-Walker (2014) who investigated the ethical dilemmas faced by client-side project managers in a large Australian University.

Walker and Lloyd-Walker (2014) found that ethical dilemmas faced by client-side project managers can be mitigated through good leadership and strong governance structures. They also found client-side project managers displayed high levels of independent thinking.

Outside the peer-reviewed literature, there is a growing body of knowledge regarding client-side project management. Both Godbold (2016) and Helal (2017) make the distinction between the roles of the client-side project manager and the contractor-side project manager within the Construction process. Helal (2017) simply notes the difference between these two types of project managers by stating that the client-side project manager's focus is on protecting the client's interests, while the contractor-side project manager is focussed on

protecting the contractor's interests. However, Godbold (2016) provides more detail on the differences between these types of project managers.

Godbold (2016) notes that the contractor-side project manager, what he calls the 'hands-on delivery' project manager, is focussed on the delivery of a 'thing', whether that be a product, a system or a facility. In contrast, he argues that client-side project managers take a more strategic view. As Godbold (2016) notes, the client-side project manager's role is more aligned with the view of the project Sponsor or programme manager. He explains that client-side project managers tend to be concerned not simply with the delivery of a physical project outcome, but also with the strategic, organisational and personal benefits that the project will deliver.

Godbold (2016) makes the observation that client-side project managers tend to demonstrate higher levels of competency in "...*commercial, leadership, communication, assurance and ethics*..." (para 26) than contractor-side project managers. Godbold (2016) makes the statement that both client-side project managers and contractor-side project managers share the same "...*core skills*..." (para 26), however he also notes that client-side project managers need to display both higher levels of competency in '*...the classical project management competencies*...' (dot point 14) and as well as "...*experience, gravitas and creditability*..." (para 26):

The idea that the effective practice of client-side project management requires something more than "...*classical project management competencies*..." (dot point 14) is a core assertion of this thesis. So, while I agree with Godbold (2016) in relation to this observation, I disagree somewhat with his statement that both client-side and contractor-side project managers share the same "...*core skills*..." (para 26). This thesis will show that there are skills which are crucial for client-side project managers that are not necessary for contractor-side project managers. In particular (i) How they manage the perceptions and expectations of project stakeholders (Chapters 4, 5 and 6); (ii) How they utilize Design Thinking to manage paradoxes and resolve poorly-defined problems (Chapters 7 and 8); and (iii) How they act as System Specialist to create and manage the Construct, Controls and Confidence required to generate value through their projects (Chapter 9).

One area in which Godbold (2016) and I do agree is in relation to his observations regarding the current gap in project management literature surrounding client-side project management. Godbold (2016) notes that most project management literature focusses on the bodies of knowledge, skills, competencies and frameworks required by contractor-side project managers, and that this has left client-side project management to “...*fit into the literature as best it can...*” (para 2). Godbold (2016) argues that this ‘ad-hoc’ approach to client-side project management research has resulted in “...*a lack of clarity about the competencies and responsibilities of the client-side project manager...*” (para 2). His comments highlight the need for additional scholarly research into the practice of client-side project management.

2.2.2 Rethinking Project Management

Throughout this thesis, project management theory and practice will be conceptualized from novel philosophical perspectives and through alternate lenses. The purpose of adopting these novel perspectives is to highlight some of the shortcomings of Traditional Project Management theory in explaining the ‘lived experience’ of client-side project managers.

The decision to adopt these new and novel paradigms resulted, in many ways, from the work undertaken by the Rethinking Project Management Network and their call for new research that will “...*contrast...with many of the dominant ideas contained within the published literature on project management...*” (Winter et al., 2006 p.640). Some of these dominant ideas include beliefs that project management is a discipline that can be adequately explained through “...*rational, universal, deterministic models...*” (Winter et al., 2006 p. 640) and can be sufficiently managed through the application of reductionist techniques (Aritua et al., 2009, Cooke-Davies et al., 2007), detailed planning (Baker et al., 2008) and mechanistic controls (Bryson and Bromiley, 1993).

One of the primary objectives of the research conducted by the Rethinking Project Management Network was to develop a proposed agenda to guide future research into the practice of project management (Winter et al., 2006). This proposed agenda contained five Directions, grouped into three main themes. These themes were theory *about* practice, theory *for* practice, and theory *in* practice (Cicmil et al., 2006). Fundamental to the research outlined in this thesis will be the two themes: theory *about* practice and theory *for* practice. When

discussing these two themes in particular, the Rethinking Project Management Network highlights the need for new research which reflects the “...*lived experience ...of practicing project management...*” (Winter et al., 2006 p.641).

When discussing theory *about* practice the Rethinking Project Management Network recommended that researchers investigate ways to move the discipline away from simplistic, life-cycle based models and the assumptions that these models are representative of the actuality of project management practice (Winter et al., 2006). Cicmil et al. (2006) agree and argue that any new research conducted under this theme should move the discipline towards models which recognise the complexity inherent within modern project management and use new ontologies and epistemologies to help create a broader, deeper and richer understanding of the ‘lived experience’ of client-side project managers. This thesis includes empirical research which views project management from different perspectives and paradigms (Chapters 3-9), thereby addressing this call from the Rethinking Project Management Network.

When discussing theory *for* practice the Rethinking Project Management Network called for new frameworks, concepts and models which help project managers address the new complexities of project management (Winter et al., 2006). The Rethinking Project Management Network argue that, in order to deal with these new complexities, modern project managers require “...*multiple images...rather than one simple, all-encompassing model or theory...*” (Winter et al., 2006 p.643)

To achieve this, the Rethinking Project Management Network recommends project management researchers undertake empirical research that will shift the profession’s focus from ‘project creation’, which is governed by production systems and control theories (Koskela and Ballard, 2006, Koskela et al., 2006, Koskela and Howell, 2008), towards theories which focus on ‘value creation’ as their primary focus (Winter et al., 2006). The Rethinking Project Management Network call for new research which moves beyond the production based ‘value chain’ (Porter, 1985) and begins to explore ‘value’ as a subjective concept which can mean different things to different stakeholders (Lund, 2010, Prahalad and Ramaswamy, 2004, Gilmore, 1997, Winter et al., 2006).

In commenting on the Rethinking Project Management Network's proposed agenda, Van der Hoorn (2017) notes the importance that the concept of 'practice' has to the future of project management research. In particular, she notes the importance that the actuality of project management, as demonstrated through the 'lived experience' of practitioners, has on achieving the Rethinking Project Management Network's research agenda (Van der Hoorn, 2017). Her comments echo those of Cicmil et al. (2006) who argue that research which explores the 'lived experience' of project management practitioners is critical if the discipline intends to better understand "...*project complexity, social process, value creation, project conceptualization and practitioner development...*" (p. 676). Both Van der Hoorn (2017) and Cicmil et al. (2006) explain that the 'practice' of project management is characterized by complex social constructs and tensions, and that this necessitates the development of a praxis-based theory. This thesis addresses this call, by investigating the 'lived experience' of client-side project managers who operate in the Australian Construction sector.

2.2.3 Dualities, Pluralities and Functional Systems

A recurrent theme throughout this thesis is the existence of dualities and pluralities within client-side project management. These dualities and pluralities come in different forms such as dilemmas, dialectics and paradoxes (Janssens and Steyaert, 1999). Chapter 7 provides a more detailed discussion of these. However for the purpose of this literature review it is suffice to highlight that "...*dilemmas refer to the impossible choice...dialectics stress complementarity...paradoxes emphasis the simultaneous presence of contradictory elements...*" (Janssens and Steyaert, 1999 pp.122-123). This thesis identifies and investigates a number of dualities and pluralities that manifest themselves in the practice of client-side project management. These include the predictability/ unpredictability, control/flexibility (Chapters 3, 6, 7), project success/client satisfaction (Chapters 4, 5, 6) and Functionality/Representation elements of value creation (Chapter 9).

The existence of dualities and pluralities are recognizable within the Rethinking Project Management Network's research agenda by their references to the tensions that are inherent within the 'practices' of project management (Cicmil et al., 2006, Winter et al., 2006). Evans and Doz (1990) explain that the existence of tension is evidence of a duality or plurality at work within that system.

The presence of dualities or pluralities brings with it, not only tensions, but the potential for different functional systems to be at work (Seidl, 2006). Where two or more functional systems co-exist within a single construct, tensions will be created at the boundaries and intersections of these systems (Luhmann, 2006). Lyotard (1983), Luhmann (1995), and Wittgenstein (2010) have all noted how these tensions result from each of the functional systems using different systemic discourses and language games to communicate. When operating within a single construct, different functional systems attempt to communicate with each other, but do so using fundamentally different codes, logics and languages (Luhmann, 2006) which are “*...ruled by different regimes, untranslatable into the other...*” (Lyotard, 1993 p.200).

The existence of dualities and pluralities, as well as different functional systems and their associated language games is a recurrent theme in this thesis.

2.2.4 Summary

In order to follow the development of the themes and concepts included in this thesis, readers need to keep in mind that:

- (i) Client-side project management is distinct from, and different too, contractor-side project management;
- (ii) There has been limited scholarly research undertaken into client-side project management which has resulted in “*...a lack of clarity about the competencies and responsibilities of the client-side project manager...*” (Godbold, 2016 para. 2);
- (iii) The Rethinking Project Management Network has proposed an agenda for project management research which, among other things, calls for new research that reflects the “*...lived experience ...of practicing project management...*” (Winter et al., 2006 p.641) to help better understand “*...project complexity, social process,*

value creation, project conceptualization and practitioner development...”

(Cicmil et al., 2006 p.676);

- (iv) Dualities and pluralities exist within ‘lived experience’ of client-side project managers. These dualities and pluralities can be in the form of dilemmas, dialectics or paradoxes.
- (v) One of the most enduring of these dualities and pluralities in the ‘lived experience’ of client-side project managers is the existence of the Positivist paradigm through which project success is assessed, and the Interpretivist paradigm through which client satisfaction is assessed.

The remainder of this thesis will explain and develop these themes as they pertain to the ‘lived experience’ of client-side project managers in the Australian Construction sector.

3 Rethinking Project Management

3.1 Structure Map

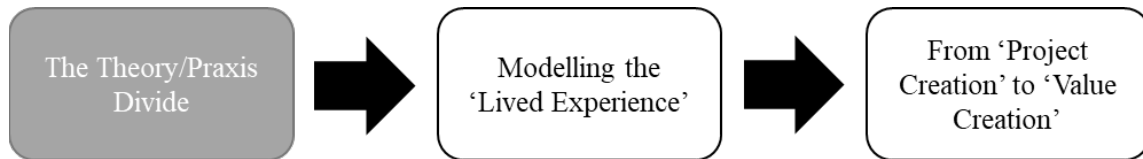


Figure 3-1: Thesis structure map (Chapter 3)

3.2 Preface

This chapter provides the full accepted manuscript from the first peer-reviewed paper developed as a result of this doctoral research. It was presented at *the Australian Institute of Project Management* conference in 2014. This paper was further developed and also presented as Usher, G & Whitty S.J, (2014). “Towards a new theory of project management: Could client-side Construction project management be a form of strategic management” In *2014 IPMA Research Conference: Theory Meets Practice in Project Management, 01-02 Dec 2014, Tianjin, China*.

3.3 Key themes of this chapter relevant to this thesis

Table 3-1: Key themes of Chapter 3 relevant to this thesis

- Traditional Project Management theory is based on Transformational Production Management Theory.
- There is a theory/praxis divide within the client-side project manager's 'lived experience'.
- Dualities exist within the 'lived experience' of client-side project managers that are not explained by Traditional Project Management theory.
- Traditional Project Management theory should be augmented with other bodies of theory to address the divide and dualities.

3.4 Citation details

Table 3-2: Citation details of original publication

Citation details	Usher, G. (2014). "Rethinking Project Management theory: a case for a paradigm shift in the foundational theory of client-side, Construction, project management". <i>Proceedings of the Australian Institute of Project Management National Conference. Brisbane</i>
# of times cited	4

Citation details from Google Scholar, as at 10 July, 2018.

3.5 Abstract

Project management has historically been defined as a subset of production and operations management. This paper assesses production management theory against a comparator body of theory, strategic management, to determine which provides the better theoretical basis for explaining challenges within the field of client-side construction project management.

Using thematic analysis, and by testing against observed phenomena, this paper highlights a number of deficiencies in the existing foundational theories of project management and demonstrates how a different body of theory can provide a better theoretical basis for explaining the Construction process, the perceived value of the project, and client dissatisfaction.

Based on these findings this paper concludes that the taxonomy used to classify client-side construction project management as production management is based on a narrow view of the profession, and is possibly hindering the development of a body of theory by limiting discussions within pre-defined constraints.

3.6 Introduction

This paper explores whether the traditionally-accepted, underlying body of theory for project management, production management, is able to adequately explain the challenges that are faced by modern-day client-side construction project managers.

To achieve this, a review of the historical origins of the three foundational theories of production management is undertaken. Having mapped these historical origins, this paper identifies the underlying principles of each of these theories and identifies commonalities between them using a thematic analysis. These common themes are then tested against both a comparator body of theory (strategic management) and phenomena observed through 15

years of field experience, to determine whether these principles adequately explain client-side construction project management.

As a result of this investigation, this paper finds that the strategic management body of theory, and not the currently accepted production management theory, provides a more valid explanation of the challenges faced by client-side construction project managers.

Based on these findings this paper concludes that the taxonomy used to classify client-side construction project management as production management is based on a narrow view of the profession, and is possibly hindering the development of a body of theory by limiting discussions within pre-defined constraints.

3.7 Background

3.7.1 What is theory and why do we need it?

Within the social sciences, theories are defined as systems of interconnected ideas that explain observed behaviour and casual relationships (Neuman, 2011). Theories are critical to the development of knowledge because they provide a common language for transferring complex ideas, create frameworks for predicting future behaviour, and provide insights for new learning within a given field of study (Koskela, 1999). In addition, theories provide the basis for understanding novel ideas, they can be abstracted to develop new concepts, developed to provide new tools, or condensed to facilitate learning (Zikmund et al., 2010).

The development a body of theory is one of the key characteristics which sets a *profession* apart from a *trade* or a *craft*. As Fugate and Knapp (1998) point out “...Mastery of theory and mastery of the practical or applied skills associated with a particular field is a hallmark of professionals...”. The development of a body of theory requires input from both academics and practitioners. These two, countervailing, forces test and hone concepts to validate ideas and in doing so gradually shape both theory and practice into an established profession.

Anecdotal evidence suggests that the average, client-side project management practitioner does not spend much time contemplating the underlying theory of their profession. However, the underlying theory impacts significantly on how they perform their everyday roles. It is from theory that frameworks are developed, these frameworks inform methodologies, and it is these methodologies that give rise to the systems and tools that are used to manage projects. Thus, theories provide the foundations for understanding every facet of a profession. Ergo if these theories are invalid, the methodology and tools that are developed from them may be flawed.

3.7.2 Is the underlying theory of Project Management fundamentally flawed?

In recent years, researchers and practitioners in the field of project management have begun to notice that the traditional methods and tools used to deliver projects are becoming increasingly inadequate (Williams, 1999). In addition, there is the sense of a growing divide between the traditionally-accepted, underlying theory of the project management and the methodologies and tools that are being used to actually deliver projects in the modern era (Morris, 2007, McKenna and Whitty, 2012, Koskela, 1999, Koskela, 2000, Koskela and Ballard, 2006, Koskela and Howell, 2008, Cooke-Davies et al., 2007).

One of the explanations provided for this methodological divide is that the existing theoretical basis for project management has reached its limits (Winter et al., 2006). As a result, many researchers are suggesting that project management theory needs to move away from the traditional ‘hard paradigm’ with its reductionist techniques and quantitative reporting, and move towards ‘soft paradigms’ and general theories of management, especially when the projects involved are being delivered in complex and dynamic environments (Aritua et al., 2009, Pollack 2007, Cooke-Davies et al., 2007, Bredillet, 2007).

Client-side construction project management is a profession that operates in complex and fluid environments (Aritua et al., 2009, Smith, 2003, Usher, 2014a, Frame, 2002). As a result of this dynamism, there are countless opportunities for carefully planned and rigorously monitored projects to encounter unforeseen challenges that can ultimately result in the project being labelled a failure (Hällgren and Wilson, 2008). In fact, the chances of these unforeseen challenges occurring are so great, that some researchers have even suggested they are an inevitable element of the construction project management process (Mallak and Kurstedt Jr, 1997, Geraldi et al., 2009).

Research by Pinto and Mantel (1990) suggests there are three broad categories from which these challenges can arise. These categories are:

- (a) The delivery process [Construction];
- (b) The perceived value of the project; and
- (c) Client satisfaction² with the delivered project.

The following literature review examines the theoretical origins of Transformational Production Management to identify the foundational assumptions of this body of theory. Following this, alternate theories for Construction project management, which have already been proposed by other researchers, will be briefly examined. Next, the rationale for the selection of strategic management as a comparator body of theory will be provided. Finally, two strategic management schools of thought will be reviewed in an attempt to ascertain which provides the most valid theoretical basis for understanding the challenges that arise in the three categories identified by Pinto and Mantel (1990).

² Throughout this paper the terms “customer” and “client” are used interchangeably.

3.8 Literature Review

3.8.1 Production Management Theory³

3.8.1.1 Taylorism - Scientific Management

Frederick Winslow Taylor (1856-1915) was a mechanical engineer who first postulated the theory of Scientific Management in 1911 (unknown, 1915). The theory of Scientific Management resulted from Taylor's twin desires to overcome the inefficiencies he observed in the existing *craftsman-based* manufacturing processes of the late 1800s - early 1900s, and to create a production environment that not only benefitted management but also benefitted the workers (Littler, 1978). It is widely accepted that Fredrick Taylor's theory of Scientific Management, is the foundation for today's modern production management theory with its influence having been identified in the most recent evolutions of production theory including lean Construction theory and Agile project management (McKenna and Whitty, 2012, McKenna and Whitty, 2013, Koskela and Howell, 2002a, Wright, 1993, Williams, 1999).

Taylor's Scientific Management theory is based on four principles:

(a) *Decomposition of tasks into definable elements:*

“...*First*...develop a science for each element of a man's work, which replaces the old rule of thumb method....” (Taylor, 1911)

³ McKenna and Whitty's 'Phylomemetic Tree' provided valuable insight into the foundations and development of project management theory (MCKENNA, T. & WHITTY, S. J. Reconceptualising project management methodologies for a post-postmodern era. 9th Annual Project Management Australia Conference, 2012 Melbourne. Eventcorp Pty Ltd.

(b) *Specific allocation of these tasks to workers selected by management and trained for the role:*

“...*Second*....scientifically select and then train, teach and develop the workman whereas in the past he chose his own work and trained himself as best he could...”(Taylor, 1911)

(c) *Strict management control to reduce deviations from planned processes:*

“...*Third*...heartily cooperate with the men so as to ensure all of the work being done is in accordance with the principles of the science which has been developed...” (Taylor, 1911)

(d) *Clear demarcation between those who should “innovate” and those who should “execute”:*

“...*Fourth*...there is equal division of the work and the responsibility between the management and the workmen. The management take over all work for which they are better fitted than the workmen...[workmen should] do what they are told [by management] promptly and without asking questions or making suggestions...”(Taylor, 1911).

3.8.1.2 Shewhart - Statistical Quality Control

Walter Andrew Shewhart (1891-1967), has been referred to as the “...*father of statistical quality control*...” ((Quality), N.D.). Along with Edwards Deming and Joseph Juran, Shewhart is considered to be one of the fathers of the quality improvement movement (Best and Neuhauer, 2006).

Shewhart’s theories arose from his observations of the manufacturing processes at the Western Electric Company, which he believed resulted in unnecessary waste and quality decline (Shewhart, 1931). Based on these observations, Shewhart identified two categories of production failures, assignable-cause and chance-cause, which he believed could be

statistically quantified and subsequently controlled. From this conviction, Shewhart proposed that:

“...through the use of the scientific method, extended to take account of modern statistical concepts, it has been found possible to set up limits within which the results of routine efforts must lie if they are to be economical. Deviations in the results of a routine process outside such limits indicate that the routine has broken down and will no longer be economical until the cause is removed...” (Shewhart, 1931)

3.8.1.3 Fordism - Mass production and mass consumption

Henry Ford (1863-1947), was not only the founder of the Ford Motor Company, he developed a complex philosophy which combined a revolutionary production system, accumulation system and a socio/political system (Cairola, N.D.). This philosophy is commonly known as Fordism. Although based on Taylorism, Fordism deviates from its Taylorist foundations in its view of machine and worker efficiency. Where Taylorism viewed these as separate elements in the production process, Fordism seeks to combine these efficiencies into one unit, thereby emphasizing cost minimization rather than profit maximization (Malsch and Dohse, 1993, Hayter).

At the heart of Fordism, are the dual drivers of mass production and mass consumption. These led to Ford’s philosophy of standardized outputs (Malsch and Dohse, 1993). Ford believed, and successfully demonstrated, that by decomposing work structures into their smallest tasks it was possible to deskill these processes, thereby allowing the production process and outputs to be standardized and carried out by predominantly unskilled labour.

3.8.1.4 Transformational View of Production Management

From these three theories (Taylorism, Shewhart and Fordism) the transformational model of production management has evolved. This conceptual model explains the production

process as a simple input-output system (Figure 3-2). The inputs are the resources which are required, the production process modifies (transforms) these into the form desired and then discharges them as outputs (Starr, 1964). Table 3-3 provides a summary of Taylorism, Shewhart's theories and Fordism as well as a visual representation of the transformational production management model.

Table 3-3: Foundational Theories and Transformational View of Production Management

TAYLORISM	SHEWHART	FORDISM
OBJECTIVES		
<ul style="list-style-type: none"> Machine efficiency. Labor productivity. 	<ul style="list-style-type: none"> Reducing variations. Waste reduction. Quality Improvement. 	<ul style="list-style-type: none"> Cost reduction. Profit maximization. Standardization (components, processes and outputs).
UNDERLYING PRINCIPLES		
<ul style="list-style-type: none"> Each part of a task can be scientifically studied. A repeatable, non-varying, best method, can be developed for performing each task. Workers will be trained in the best, scientifically developed method for performing the tasks. Work can be divided (decomposed) so that management can plan using scientific principles, and workers simply need to execute the developed plan (without deviation). Output requirements known from commencement of input stage. 	<ul style="list-style-type: none"> Reducing variations in the manufacturing processes will improve quality. Deviations in the routine process indicate a breakdown in the production process. All deviations result in lost economic outcomes until they are rectified. Quality can be improved if enough management control is applied. 	<ul style="list-style-type: none"> Standardized inputs, processes and outputs. Processes can be tightly controlled by management. Deskilling production processes will increase efficiency and allow continuous improvement. Customer's needs are fully known at the commencement of the process. Customer's needs do not change throughout the process.
TRANSFORMATIONAL VIEW OF PRODUCTION MANAGEMENT		

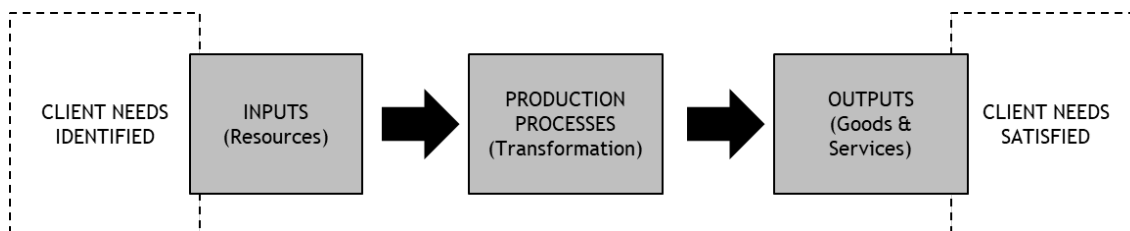


Figure 3-2: Transformational Production Management system

3.8.2 Proposed alternate Construction project management theories

This paper is not the first to recognize the apparent deficiency in production management theory's ability to explain and help understand Construction project management. Over recent years, researchers in the field of project management have identified the need to take a serious look at the validity of the theoretical basis for Construction project management (Williams, 1999, Cicmil et al., 2006, Koskela, 1999, Koskela, 2000, Koskela and Ballard, 2006, Koskela and Howell, 2008, Cooke-Davies et al., 2007). From these investigations a range of alternate bodies of theory have been proposed. These alternate bodies of theory include:

- (a) VFT Production Theory;
- (b) Complexity Theories; and
- (c) Actuality Theory.

3.8.2.1 Value-Flow-Transformation (VFT) Theory

The Value-Flow-Transformation (VFT) theory of production management is an attempt to create a unified, explicit theory for production management for the Construction industry (Koskela, 2000). This theory emerged from the belief that the existing transformational theory of production management, of which project management is supposedly a sub-set (Project Management Institute (U.S.), 2013), does not provide an expansive enough theoretical foundation to address the many challenges that practitioner's face.

Working from the premise that there is “...*there is no explicit theory of project management..*” (Koskela and Howell, 2008), the VFT theory attempts to reconstruct a unified theory for Construction project management by drawing together three discrete bodies of theory from production management (Koskela, 2000, Koskela and Howell, 2008). By combining Value and Flow theories with the traditional Transformational theory

of production, the VFT theory attempts to incorporate time and elimination of waste (Flow theory) and undefined customer needs and value perception (Value) into basic scope management (Transformational) theory. (Shewhart, 1931, Koskela, 2000, Koskela and Ballard, 2006, Cook, 1997, Embrechts et al., 1999, Wortmann, 1991).

While the VFT theory does present an alternate theory for Construction project management, it has three distinct shortcomings. First, all three theories used to create VFT theory are drawn from a production management body of theory. This assumption reinforces the premise that production management provides the best theoretical basis for understanding Construction project management - an assumption even proponents of the VFT theory argue is questionable (Koskela, 2000, Koskela and Howell, 2008). Secondly, it could be argued that rather than create a parsimonious solution (Neuman, 2011), this theory creates additional complexity, as each of the three theories used to develop VFT already have their own constructs, methodologies and tools (Shewhart, 1931, Wortmann, 1991, Embrechts et al., 1999). Finally, while the amalgamation of these theories augments the traditional Transformational theory of production management to create a more holistic view of production management in the Construction industry, it does little to uncover new insights for the development of project management theory.

3.8.2.2 Complexity Theories

Complexity theories attempt to explain how order, novelty and structure can arise from apparently chaotic systems, and how diverse behaviour can emerge from uncomplicated underlying rules (Cooke-Davies et al., 2007). Over recent years, researchers have been investigating whether complexity theories provide a more valid means for understanding the nature and practice of project management than the traditionally accepted production management theory (Williams, 1999, Melgrati and Damiani, 2002, Richardson et al., 2005, Pollack 2007).

Complexity theories are developed from a broad range of academic fields including mathematics, life sciences and physical sciences. Complexity theories differ from other

theories in that they try, not only, to explain ideas and objects but also attempt to address the complex nature of the relationships that exist between these elements (Cooke-Davies et al., 2007). These theories have been applied to model dynamic systems such as weather patterns, viral infections, natural disasters, traffic networks and the world market (Ottino, 2003, Weick, 1990, Sellnow et al., 2002).

These theories have allowed researchers to develop more detailed understanding regarding complex adaptive systems. These systems share similar characteristic to the Construction environment in that they contain primary and secondary inter-relationships between elements, they are both open systems that are required to perform adaptively, they are self-organizing organism with emergent tendencies, they have multiple feedback loops, and progress in non-linear sequences (Cvitanovic, 1984, Thiétart and Forgues, 1995, Tsoukas, 1998).

A central premise of complexity theories is that these complex adaptive systems need to be considered as more than their individual parts. That is, the benefits, risks and challenges faced within these systems cannot be completely capitalized on, or mitigated using reductionist tools or systems. (Aritua et al., 2009, Cooke-Davies et al., 2007).

Despite being used to build theory and model systems across a range of disciplines, it has been noted that complexity theories are relative newcomers to theoretical development (Gonzalez, 2010, Whitty and Maylor, 2009). As such, while they may provide valuable insights, they have resulted in relatively few practical tools that can help manage or control these complex systems. (Whitty and Maylor, 2009).

3.8.2.3 Actuality Theory

Another form of complexity theory that has been applied to project management, is Actuality theory (Cicmil et al., 2006). Actuality theory attempts to identify a praxis-based theory which can be applied in multiple contexts and environments (Bourdieu, 1977, Wood, 2002). Actuality theory provides a different perspective on the application of

complexity theories to project management, because it approaches the theory from an Interpretivist paradigm, using a “becoming” rather than “being” ontology (Chia, 2002) and pragmatic epistemology (Calon, 2002).

Project “actuality” emphasizes the importance of the ‘lived experience’ of project managers. This theory focuses on the complexity of the social setting of the project environment, with particular reference to the tensions that can develop due to control issues, unpredictability and interactions between the project actors (Cicmil et al., 2006).

The strength of Actuality theory is that it is based on rich ethnographic data that helps broaden the foundations of project management theory by building a more pluralistic understanding of the nature of profession (Cicmil et al., 2006, Alvesson and Deetz, 2000). Unfortunately, the subjective nature of Actuality theory means that it cannot present a universal theory for project management. For this reason, even proponents of Actuality theory suggest that it is not a theoretical basis for project management, rather it provides an alternate lens through which new insights into project management theory and practice can be gained (Cicmil et al., 2006).

3.8.3 Strategic Management

3.8.3.1 Strategic Management as an alternative body of theory.

In order to determine if production management theory is the best foundation for client-side construction project management, we need to select a body of theory that can be used as a comparator. For the purpose of this paper, strategic management has been selected. The decision to select strategic management theory as the basis for comparison is due to the common characteristics this body of theory shares with client-side construction project management.

Firstly, both strategic management and client-side project management have a similar purpose. The purpose of strategic management is to manage a process that will result in a

unique outcome that creates a competitive advantage (Tse and Olsen, 1999, Hitt et al., 2011, Porter, 1980). Whereas, the purpose of project management is to manage a process that creates a unique result (Project Management Institute (U.S.), 2013).

Secondly, both strategic management and client-side project management work in variable delivery timescales. In today's commercial environment, Construction projects can range in delivery times from months through to decades (Altshuler and Luberoff, 2003, Orueta and Fainstein, 2008), while corporate strategists are finding their formulation and execution processes are taking place in markets which can take decades to see full realization, or conversely, be so unstable that strategic delivery is considered a temporary undertaking which is measured in terms of months. (Acur and Englyst, 2006, Ensign, 2008).

Thirdly, both strategic management and client-side project management commence their life-cycle by attempting to codify intangible concepts into formal plans for the purpose of implementation. In the field of strategic management, this is achieved through the development of strategic planning documents, financial and scheduling forecasts, resource planning and stated deliverables (Schaap, 2012, Mintzberg, 1994, Hart, 1992). In client-side construction project management, this is achieved through scoping documents, project plans, financial and scheduling forecasts, resource planning, and stated deliverables (Ingason and Jónasson, 2009).

Fourthly, both strategic management and client-side construction project management must operate in complex delivery environments that are subject to variability and uncertainty (Bracker, 1980, Project Management Institute (U.S.), 2013, Steiner and Miner, 1972). Furthermore, both the strategic management and project management bodies of theory, recognize that these fluid environments requires their field to develop frameworks which help anticipate and cope with this unpredictability (Bracker, 1980, Ives, 2005b).

Finally, the skills required from both strategic managers and *client-side project managers* are strikingly similar. Both practitioners need to look at their subject matter as generalists rather than specialists. They both require the ability to quickly identify and assess opportunities and threats. They both require the ability to identify and analyze facts to take advantage of opportunities and mitigate risks, and both recommend courses of action in terms of “...*detailed plans, financial, production, technical and facilities solutions...*” (Steiner and Miner, 1972, Williams and Samset, 2010)

3.8.3.2 Strategic Management schools of thought.

Within the strategic management body of theory, there ten identifiable schools of thought that relate to the conception, formulation and implementation of strategy (Mintzberg, 1989). It is generally accepted by academics in this field that these ten schools fall along a continuum reaching from purely deliberate strategies, through to purely incremental ones (Mintzberg, 1994, Mintzberg, 1990, Mintzberg and Waters, 1985, Wiesner and Millett, 2012) This paper will not review each of the possible strategy development schools of thought, rather it will investigate the two schools of thought considered to be polar opposites on the strategic management continuum (Slevin and Covin, 1997, Mintzberg and Waters, 1985). These are:

- (a) The Design (Deliberate) School; and
- (b) The Emergent (Incremental) School.

3.8.3.3 Design (Deliberate) School

The Design (Deliberate) school of strategic management is the most commonly recognized strategic management paradigm (Mintzberg, 1990). The basic theory of the Design school of strategic management was first published by Philip Selznick (1957) and was quickly elaborated on by others such as Alfred Chandler (1962) and Igor Ansoff

(1965) before being adopted by the Harvard Business School of Business Policy itself (Mintzberg, 1990).

The Design school advocates a deliberate and analytical process to strategy development (Acur and Englyst, 2006, Pettigrew, 1992). This process requires executives and strategist to assess the external and internal environments (Andrew, 1987). Once this assessment is complete these strategists formulate and plan corporate strategies, then present these as formalized statements of intent to Organisational managers for implementation (Schaap, 2012, Hart, 1992, Mintzberg, 1994). Deliberate strategies can be recognized by the fact that the intentions of the strategy are fully formed and expressed prior the commencement of implementation (Mintzberg, 1987).

3.8.4 Emergent School

The Emergent (Incremental) school of strategic management had its origins in Braybrooke and Lindblom's early work on disjointed incrementalism (1963) and Cyert & March's work on the behavioural theory (1963). These concepts were further developed through Quinn's logical incrementalism (1978), Weick's idea of retrospective sense making (1979) and Mintzberg's work on Emergent strategies (1979).

The fundamental tenet of the Emergent school is that within unstable, complex and dynamic delivery environments, the concept of adhering to a complete priori statement of intent is not only illogical, it can be completely futile (Quinn, 1978). Instead, the Emergent school advocates that the development of the final outcome needs to be flexible, adaptable and dynamic enough to address the vast number of internal and external influences that can impact on the outcome (Loasby, 1967, Fletcher and Harris, 2002).

The Emergent school argues that the only logical means for coping with the innumerable and powerful forces that can occur in these environments is to let the final outcome be guided by them (Quinn, 1978). The Emergent school advocates that the optimal output

from the delivery process can only be realized by learning from the environment, having managers balance control with risk aversion, responding opportunistically to new information, threats and crises, and by allowing an unintended order to develop from broad concepts towards specific outcomes (Quinn, 1978, Mintzberg and Waters, 1985, Wiesner and Millett, 2012, Johnson et al., 2005).

3.9 Research Gaps

As previously demonstrated in this paper, there is already an established gap between the currently accepted, production-management based theory, and the practices and challenges being faced by today's client-side construction project manager.

The VRT theory provides a possible alternative for a theoretical basis for this field. However, as highlighted, this theory appears to have three specific shortcomings (a) it does not question the fundamental assumption that production management is the best theoretical basis for client-side construction project management; (b) it augments the existing theory, but does not necessarily provide new opportunities or insights for theoretical development, and (c) it creates theoretical complexity rather than resolves it.

Complexity theories do have the potential to provide new opportunities and insights into client-side construction project management theories, and they do challenge the underlying assumption of that production management provides the most valid theoretical foundations for the field. However, they lack the practical tools that practitioners will require to manage and control the dynamic environment.

Similarly, Actuality theories provide a novel perspective for gaining understanding in the field of client-side construction project management. However, even its proponents concede that due to the subjective nature of Actuality theories, developments based on this body of theory will only augment our understanding of methodologies and practices, rather than provide a universal basis for project management theory.

Hence, even with these new developments and alternate theories applied, there is still a need to find an alternative body of theory for client-side project management that can adequately explain the environment and challenges, and provide new insight for developing new theoretical insights for today's client-side construction project managers.

3.10 Research Question

“Is there an alternate body of theory to production management, that can adequately explain the Construction process, differences in the perceived value of the completed project, and the reasons for client dissatisfaction in the field of client-side construction project management?”

3.11 Methodology

3.11.1 Approach to Research

This research is approached using an objectivist ontology and a positivist epistemology. As the intention of this research is to make a judgment about the validity of the foundational theories of project management, the research can be categorized as part of the Radical Structuralist paradigm (Burrell and Morgan, 1982).

3.11.2 How do we test theories?

Theories can be categorized as either explicit or implicit. Explicit theories are scientifically verifiable and can be validated by empirical means. Implicit theories, however, are more difficult to test. By definition, implicit theories rely on operational improvisation and tacit knowledge (Johnston and Brennan, 1996) making them difficult to quantify for the purpose of empirical testing.

One way to test the validity of implicit theories is by studying whether the fundamental principles and assumptions of that theory can explain the challenges commonly by practitioners in the field (Koskela and Howell, 2008, Zikmund et al., 2010). A second test is to assess how well these theories explain or align with the common practices observed within the field (Saunders et al., 2012, Neuman, 2011). If a body of theory cannot adequately achieve these outcomes, we should attempt to identify an alternate theory which may better fulfil these functions. If the new body of theory does achieve these outcomes, we must accept the comparator theory's validity over the original (Koskela and Howell, 2008, Koskela and Howell, 2002a).

3.11.3 Comparative Analyses

This paper assesses the validity of both production management and strategic management bodies of theory by conducting two forms of comparative analysis. The first is through a thematic analysis, the second by testing both bodies of theory against observed practices and events.

3.11.3.1 Thematic Analysis

The thematic analysis of the bodies of theory was conducted using the guidelines outlined by Aronson (1994). Data were collected on the bodies of the theory through a literature review. For production management, this literature review traced the origins of production management theory back its roots in Taylorism, Shewhart's quality theories and Fordism.

Following the review of production management theory, alternate bodies of theory from other research were reviewed. Next, a literature review was conducted on two opposing schools of thought in the strategic management body of theory, the Design school and the Emergent school.

The data collected through the literature review were analyzed to identify any underlying principles and assumptions which create common patterns (themes) in the data. In order to provide a basis for the categorization of the identified themes, an acceptable classification system was identified from within the existing literature.

The final stage of this analysis was to undertake a meta-level analysis of the identified themes and to record against the pre-selected classification system.

3.11.3.2 *Comparison against observed phenomena*

Following the thematic analysis, a second validity test was undertaken. This test was conducted by analyzing the bodies of theory under assessment against a range of observed phenomena from the field of *client-side construction project management*.

The fundamental assumptions of the transformation view of production management and the Design and Emergent schools of strategic management were analyzed against the observed phenomena.

This analysis resulted in an assessment of the investigated bodies of theory's ability to explain or understand the observed phenomena.

3.11.3.3 *Interpretation*

Upon completion of both the thematic analysis and test against observed phenomena, the findings were interpreted to create a holistic understanding of the patterns. The interpretation of the findings was then categorized into the three broad outlined by Pinto and Mantel (1990) to provide meaning and context.

3.12 Analysis

3.12.1 Thematic Analysis – Production Management

Taylorism, Shewhart's theories and Fordism were all conceived in similar economic environments and developed by observing the same, very specific, type of production (i.e. factory-based manufacturing). It should not be surprising then, that these three theories have a commonality in their understanding of what production is and how it should be managed.

Table 3-4 provides a meta-level analysis of the underlying assumptions of the three foundational theories of modern production management, using the five components of the transformational view of production management as the themes for categorization (Customer's needs, Inputs, Delivery Process, Outputs, Customer's satisfaction). The results of this thematic analysis identifies the following assumptions which are common to all three theories:

Table 3-4: Meta-level comparison of common production management assumptions

Assumptions regarding Customer's Needs
<ul style="list-style-type: none"> • The needs of the customer are well defined at the commencement of the delivery process. • The needs of the customer do not change throughout the delivery process.
Assumptions regarding Inputs
<ul style="list-style-type: none"> • The resources required for each tasks in the process can be completely quantified prior to the commencement of delivery. • No task in the delivery process will alter the resources required (i.e. The process is a closed system).
Assumptions regarding the Process
<ul style="list-style-type: none"> • The delivery process is linear and sequential. • Sequential tasks do not start until predecessor is completed to a preset benchmark, or workstations capacity exists (i.e. a "pull system"). • The delivery process is predefined and rigidly adhered to. • Deviations are process problems which must be rectified. • The delivery process takes place in a stable environment. • The delivery process produces standardized or mass produced outputs. • Management has significant control over the delivery process and quality outcomes.
Assumptions regarding Outputs
<ul style="list-style-type: none"> • The final output is a repetitive. • The final output is completely expected. • The final output should have no, or minimal, deviation from the originally agreed customer need.
Assumptions regarding Customer Satisfaction
<ul style="list-style-type: none"> • The delivery of the agreed output will guarantee customer satisfaction. • Customer satisfaction is absolute (i.e. the output is either what the customer required, or it is not).

3.12.2 Thematic Analysis – Design School of Strategic Management

Table 3-5 provides a meta-level comparison of the underlying assumptions of the Design School of strategic management using Customer's needs, Inputs, Delivery Process, Outputs, Customer's satisfaction as the analysis categories. This thematic analysis identifies the following assumptions:

Table 3-5: Meta-level comparison of common Design school strategic management assumptions

Assumptions regarding Customer's Needs
<ul style="list-style-type: none"> Customer's needs are unique in terms of outcomes required, resources necessary and perceived value. The customer's needs must be fully formed and articulated before the inputs and delivery process can be determined.
Assumptions regarding Inputs
<ul style="list-style-type: none"> Resources are predefined. A designed strategy understands the resources required and can determine in advance if additional resources will be required for delivery. The initial inputs are intangible. They consist of ideas and concepts which must be creatively developed. Once this process is completed the inputs must be formalized into plans that can be implemented. Formalized plans (scope, cost and timing) should include strategic control systems designed to report on environmental or organisational deviation from the stated objectives.
Assumptions regarding the Process
<ul style="list-style-type: none"> The delivery process should follow the formalized statement of intent as closely as possible. While the process is not explicitly linear and sequential, the Design school believes in the manager's ability to tightly control the delivery process. While deviations can be anticipated and planned for, the fundamental assumption of the formalized strategy is that these eventualities have already been considered and planned for within the codified plans. The delivery process while not strictly rigid, should be adhered to as closely as possible to the formalized plan provided by the strategists. Delivery will take place in a dynamic environment, which has the potential to impact on the formalized plans. Hence strict control systems need to be in place.
Assumptions regarding Outputs
<ul style="list-style-type: none"> The final outputs of the process will be unique. The final outputs will be in accordance with the originally designed plans. The final output may have some, but not large, deviations from the originally designed plans.
Assumptions regarding Customer Satisfaction
<ul style="list-style-type: none"> The delivery of the agreed output should result in customer satisfaction, provided the originally planned strategy used correct assumptions in its formation. Customer satisfaction does not need to be absolute, provided the final result gives a unique competitive advantage.

3.12.3 Thematic Analysis – Emergent School of Strategic Management

Table 3-6 provides a meta-level comparison of the underlying assumptions of the Emergent school of strategic management using Customer's needs, Inputs, Delivery Process, Outputs, Customer's satisfaction as the analysis categories. This thematic analysis identifies the following assumptions

Table 3-6: Meta level comparison of common Emergent school strategic management assumptions

Assumptions regarding Customer's Needs
<ul style="list-style-type: none"> • Customer's needs are unique in terms of outcomes required, resources necessary and perceived value. • The customer's needs are not fully understood, and cannot be completely formalized.
Assumptions regarding Inputs
<ul style="list-style-type: none"> • The process will dictate the resources required. The purpose of management is to identify these resources needs as they present themselves and manage them as efficiently as possible. • The strategy is not planned in advance, it presents itself through action. Therefore, the inputs cannot be completely determined in advance as they must be flexible and adaptable to allow the unintended order to emerge.
Assumptions regarding the Process
<ul style="list-style-type: none"> • The delivery process may be linear and sequential, but emergent theory assumes that the process will be impacted by its environment. Therefore the need to adapt the delivery process is an ever-present possibility. • The delivery process can be planned, but should not be rigidly adhered too. Managers must scan their environments to assess if new, better strategies are developing, or if the originally planned strategy is failing or inconsistent with the evolving environment. • Deviations from the originally strategy should be assessed to determine if they are beneficial to the desired outcome, or a threat to it. • The delivery process takes place in an unstable environment that is constantly changing. • The process will produce a unique outcome that may be significantly different from the originally planned strategy, however the unforeseen outcome may be a better result than the originally planned outcome. • Management has little control over the process. Their role is to actively adapt to the changing environment and make sure the developing strategy has the necessary resources required to be successful.
Assumptions regarding Outputs
<ul style="list-style-type: none"> • The final outputs will be unique. • The final outputs will probably not be what were originally envisaged. • The final output may have significant deviation from the original idea, however these deviations may improve the final outcome if they have been creatively adapted into the final deliverables.
Assumptions regarding Customer Satisfaction
<ul style="list-style-type: none"> • Customer satisfaction will not be entirely dependent on achieving the outcomes originally planned, rather it will be dependent on the perceived value of the deliverables and how that aligns with their needs at the end of the process.

3.12.4 Analysis against observed phenomena

Having identified the underpinning assumptions of production management theory (Transformation) and strategic management theory (Design & Emergent) through the thematic analysis, a further analysis of these theories was conducted against observed phenomena from within the field of *client-side construction project management*. These observations have been drawn from 15 years of field experience, and are categorized according to the themes previously established in this paper.

This analysis assesses the validity of each of the theories by determining whether their underlying assumptions have the ability to explain and/or help understand the observed phenomena. Table 3-7 provides the results of this assessment.

Table 3-7: - Comparison of observed phenomena against production and strategic management theories

Observed phenomena	Underlying assumptions help explain or understand phenomena		
	Production management	Strategic Management	
	Transformation	Design	Emergent
Needs			
Client needs are identified at the commencement of the process, but require further development before they can be codified	No	Yes	Yes
Client needs change throughout the life of the project as a result of internal and external factors	No	No	Yes
Formal reporting based on pre-defined parameters is required to allow decision making and control	Yes	Yes	No
Inputs			
A clear understanding of inputs is required at the commencement of the delivery process to facilitate decision making.	Yes	Yes	No
Required inputs may change throughout the life of the project	No	Yes	Yes

Delivery Process			
The process takes place in a complex and dynamic environment.	No	Yes	Yes
The process can be flexible. Not all tasks need to be completed as originally sequenced.	No	No	Yes
The process is subject to unpredictability which can alter the intended process	No	No	Yes
Deviations in the planned process may result in time and cost savings	No	No	Yes
Management control over the process and quality of outputs is limited	No	Yes	Yes
Outputs			
Final output is unique	No	Yes	Yes
Final output may not be as originally expected	No	No	Yes
Final output may include significant deviation from the originally codified customer need.	No	No	Yes
Satisfaction			
Delivery of final output delivered does not guarantee customer satisfaction	No	No	Yes
Customer satisfaction is generally not absolute. Satisfaction can vary significantly on different aspects of the final product.	No	No	Yes

3.13 Findings

The thematic analysis and assessment against observed phenomena have identified a number of shortcomings in the ability of all three of the theories investigated to adequately explain client-side construction project management. These deficiencies can be categorized using the three broad areas of project management challenges identified by Pinto and Mantel (1990).

3.13.1 The delivery process [Construction]

As a result of its origins in factory-based manufacturing, production management theory uses a specific set of assumptions regarding the production process. In factory-based manufacturing, the production process takes place in a stable environment and has as its end goal the mass production of non-varying outputs. The process itself is linear and

sequential and is driven by preset standards which are rigidly planned and strictly adhered too. Deviations from the planned process are assumed to result in loss of economic inefficiencies and as such, must be rectified as quickly as possible.

In contrast, the Construction process is intended to produce one, very specific outcome which must be produced in a dynamic environment that will almost inevitably consist of innumerable variants that cannot be planned for.

The Design school of strategic management does not require the delivery process to be as rigidly planned or as strictly adhered to as production management theory, however it does expect that the process will run more or less as outlined in the planning stages. Unlike production management theory, the Design school of strategic management does not require a stable environment for the production process to be fulfilled. However, it does inherently assume that deviations which result from this dynamic environment can be foreseen and prepared for using codified strategies to mitigate or address this variability.

In contrast to both production management theory and the Design school of strategic management, the Emergent school anticipates that the delivery process will be impacted by unforeseen variables that cannot be fully planned for in advance. Emergent theory does not require a linear or sequential process, rather it assumes that delivery is best understood as a learning process that needs to be continually monitored and assessed by skilled managers and practitioners to ensure the best possible outcome is achieved. As a result, the Emergent school of strategic management does not assume all deviations from the envisaged process result in economic inefficiencies, instead it acknowledges that deviations should be considered on their merits to determine if the deviation presents an opportunity or a threat to the final outcome.

3.13.2 The perceived value of the project

In production management theory, the value of the project is completely understood by the customer either prior to selection (e.g. the selection of a particular television) or prior to

the transformation process commencing (i.e. for specific manufactured components). The ultimate usefulness of the outcome, its ability to fulfil the customer's stated need, the cost of the resources and processes can all be quantified before production begins. Because the final output should contain no deviations from the original value proposition, the final outputs should be completely aligned with the customer's perceived value of the produced item.

In a similar way, but not to the same extent, the Design school believes that the perceived value of the output should contain minimal deviation from the customer's original value proposition. For this reason, strategists using Design school theory employ various strategic control systems (schedules, cost plans, stated deliverables, quality measures, resourcing plans, etc) to detect and action any deviations from the codified strategy. These control systems are regularly monitored using a variety of reporting systems and tools (e.g. benchmarking, executive dashboards, annual financial reports). From a value perspective, these control systems serve not only as a checking mechanism but also as a tool for managing the expectations of the customer throughout the process to ensure the perceived value of the output aligns as closely as possible to the original value statement from within a dynamic environment.

The Emergent school understands perceived value in a completely different way. Unlike production and Design school theory, the Emergent school assumes that the customer's value proposition at the commencement of the process may change considerably as a result of internal and external environmental factors that can occur. These factors may increase or decrease the value of the original customer need and, as such, the strategist or manager must create a symbiotic relationship between the customer, the environment and the production process in order to achieve a realistic value outcome.

3.13.3 Client satisfaction with the delivered project.

Closely linked to the idea of perceived value is the concept of satisfaction. Where the perceived value of the outputs is misaligned with the expected value of the output, client dissatisfaction can occur.

Within the transformational view of production management, it is relatively easy to predict whether customer dissatisfaction will occur. If the final output does not fulfil the customer's original need, Transformational Production Management theory assumes the client will be completely dissatisfied.

The Design school anticipates the possibility of client dissatisfaction, however it attempts to mitigate this through detailed and careful planning at the inputs stage, and through strict monitoring and correction of deviations from the stated plan, throughout the delivery process.

The Emergent school does not provide discrete indicators of the potential client dissatisfaction. Because the Emergent school assumes delivery is a dynamic process which is influenced by internal and external factors, the degree of client satisfaction/dissatisfaction cannot be anticipated. Within the Emergent school of theory, the degree of *client satisfaction* can only be known once the client determines if final output meets their actual needs at the end of the process, as opposed to their stated needs at the commencement of the process.

3.14 Discussion

As demonstrated in this paper neither the Transformational Production Management theory, the Design school of strategic management, nor the Emergent school of strategic management has the full scope to adequately understand or explain the delivery

processes, the client's sense of value and client dissatisfaction in the field of *client-side construction project management*.

Firstly, we see that the development of the customer's needs from intangible concepts aligns more closely with strategic management's Design and Emergent theory than it does with the production management theory.

Secondly, this development process produces a set codified strategy documents that are interactively developed with the Customer. This process is more closely aligned with the Design school than it is with either the Emergent school or transformational production management.

Thirdly, we see that the complexity and variability of the delivery process in Construction align more closely with the Emergent school than it does with either the Design school or transformational production management theory.

Hence, none of the theories alone provides an adequate explanation for the three categorize of challenges faced by *client-side construction project management*. However, when viewed as a body of theory, rather than specific schools of thought, strategic management does provide an explanation and understanding that the production management body of theory cannot.

When viewed holistically, the strategic management body of theory highlights that *client-side construction project managers*' plan, monitor and report on projects using the underlying assumptions of the Design school of strategic management thereby anticipating a specific value outcome for the customer. However, the processes used to deliver the final output are more closely aligned with the Emergent school of strategic management, which in turn produces a different value outcome. This *duality* is conceptualized in Figure 3-3.

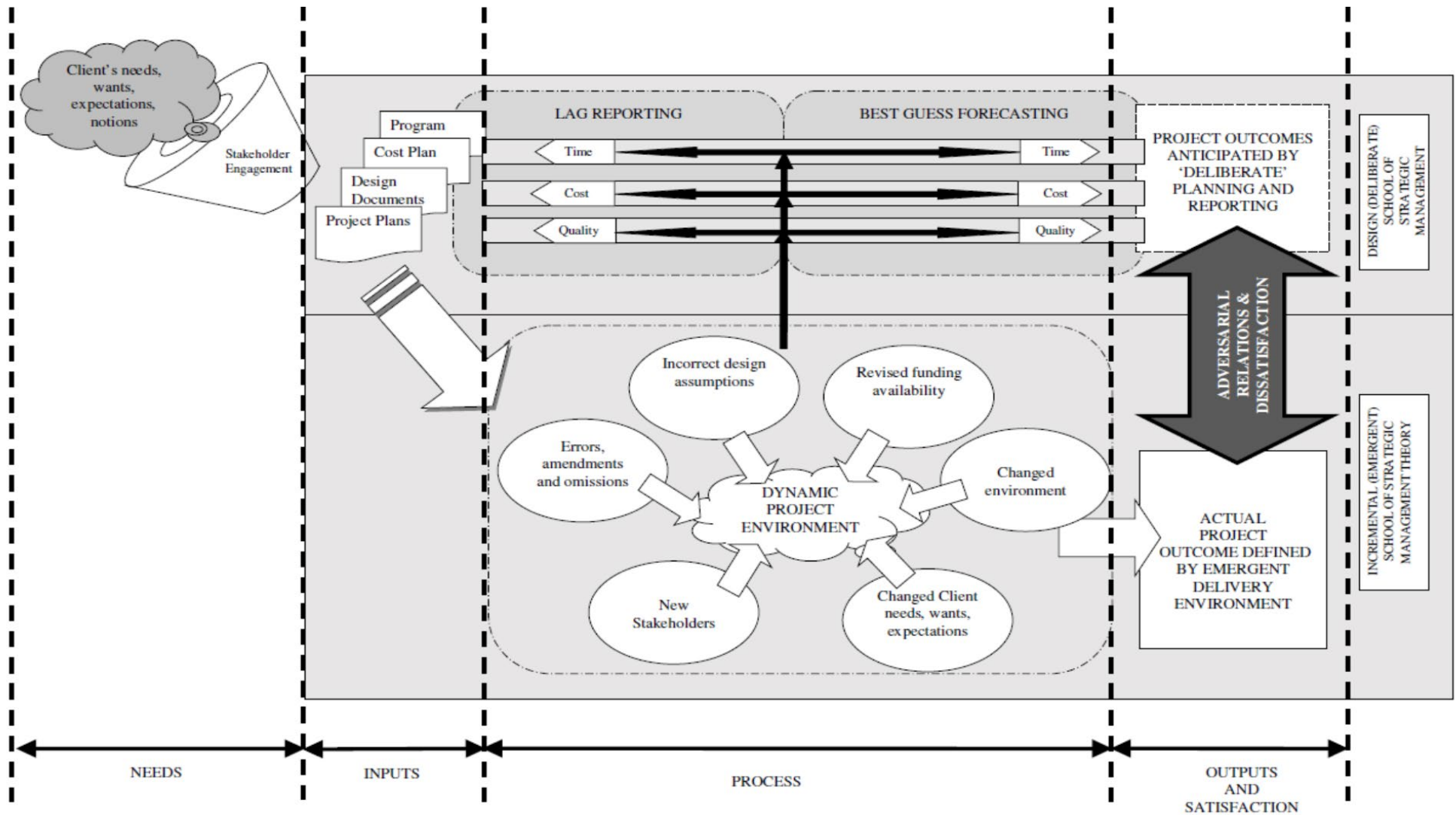


Figure 3-3: Customer dissatisfaction in client-side Construction project management explained by the strategic management body of theory

4 Identifying and managing Drift-Changes

4.1 Structure Map

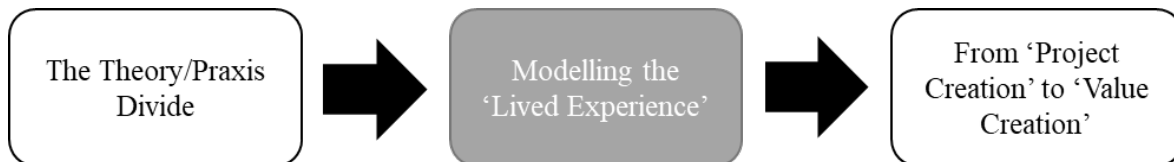


Figure 4-1: Thesis structure map (Chapter 4)

4.2 Preface

This chapter provides the full, accepted manuscript from an empirical, peer-reviewed paper developed as a result of this doctoral research. This paper, titled “Identifying and managing Drift Changes”, is published in *the International Journal of Project Management*. This article was recognized with the USQ Publication Excellence Award for Journal Articles – Student Category, 2017. Round 2. Winner (Refer photo on right). The genesis of this paper developed as a result of my reflections on the linearity and stability suggested in the Traditional Project Management theory, and how this did not appear to match my experience as a client-side project manager in the Construction sector. At the same time, and as a result of the findings in Chapter 3, I was beginning to feel that there was an important duality operating within client-side project management between the concepts of project success and client satisfaction. A duality which was not sufficiently addressed within the extant body of theory. This paper was the first attempt at identifying and articulating that duality.



4.3 Key points of this chapter relevant to this thesis

Table 4-1: Key themes of Chapter 4 relevant to this thesis.

- The difference between project success and client satisfaction in the ‘lived experience’ of the client-side project manager.
- Understanding how shifting project trajectories can create new pathways to project completion, and the role this plays in achieving both project success and client satisfaction.
- Value-creation by the client-side project manager.

4.4 Citation and Co-author details

Table 4-2: Citation details of original publication.

Citation details	Usher, G. & Whitty, S. J. (2017). "Identifying and managing Drift-changes". <i>International Journal of Project Management</i> , Vol. 35 No.4, pp 586-603
# of times cited	4
Writing	Greg Usher (90%); Dr S.Jon Whitty (10%)
Data collection and analysis	Greg Usher (100%)
Quality Review	Greg Usher (80%); Dr S.Jon Whitty (20%)

Citation details from Google Scholar, as at 30 July, 2018.

4.5 Abstract

This paper contributes to the body of knowledge regarding the project management of unexpected events by exploring a phenomena which it terms Drift-changes. These changes occur when external influences impact on a project causing it to deliver outcomes that were not originally requested or envisaged by the stakeholders. Using a Grounded Theory methodology, our research finds that Drift-changes are distinct from two previously identified change typologies, Plan-changes and Goal-changes. Our research provides clear criteria for

the identification of Drift-changes and demonstrates that Drift-changes should be managed by using a Revision or Re-opening to shift the project to a goal-seeking mode, before establishing new project trajectories and shifting the project back to a goal-oriented mode.

4.6 Introduction

This paper contributes to the body of knowledge regarding the project management of unexpected events by exploring a phenomena which it terms Drift-changes. Drift-changes occur when external influences impact on a project causing it to deliver outcomes that were not originally requested by the stakeholders. Drift-changes impact on a project manager's ability to deliver the project goals they were commissioned to deliver. However, our research shows that Drift-changes can be effectively managed to achieve both project success and stakeholder satisfaction despite creating significant deviations from the project's originally anticipated goals.

Our research is positioned between Dvir and Lechler's (2004) research, which identified the change typologies of Plan-changes and Goal-changes, and Söderholm's (2008) research on the project management of unexpected events. Our research indicates that Drift-changes are distinct from the two change typologies identified by Dvir and Lechler (2004).

With this distinction made, our research investigates these changes by asking "How can project managers identify and manage Drift-changes?"

Using a Grounded Theory research methodology we conducted semi-structured interviews with a purposively selected theoretical sample of ten project management professionals. Our interviews investigated their experiences in managing Drift-changes. The data collected from these interviews were triangulated through an archival content analysis of sixty-nine monthly project reports, five lessons learned reports, two post-occupancy evaluations, and three project finalization meeting minutes

Our research demonstrates that Drift-changes are clearly identifiable and that these changes can be managed by using a Revision or Re-opening to shift the project to a goal-seeking mode, before establishing new project trajectories and shifting the project back to a goal-oriented

mode. Furthermore, we found that when a project has drifted from its initial trajectory to such an extent that a Revision or Re-opening is necessary, there may be more value in the project manager working to adjust the stakeholder's expectations than there is in applying energy and resources into driving the project towards the originally anticipated goals.

4.7 Background and contiguous literature

4.7.1 What are Drift-changes

Project management is a discipline which relies heavily on detailed planning and strong mechanistic controls to achieve favourable project outcomes (Baker et al., 2008, Bryson and Bromiley, 1993). Traditional Project Management theory would have practitioners believe that developing a well-documented Initial Plan that sequences tasks, allocates resources and demonstrates how project outcomes can be delivered within the known constraints, is a fundamental precursor to achieving successful project outcomes (Hällgren et al., 2009, Project Management Institute (U.S.), 2013).

This type of detailed and deliberate planning is founded upon certain assumptions, these being: that projects follow rationalistic and linear sequences (Taylor, 1911, Shewhart, 1931, Deming, 1967, Usher, 2014b); that the planner is in possession of perfect information when developing the Initial Plan (Ernst, 2002, Brown and Eisenhardt, 1997); and that the delivery of the project will be conducted in a stable and controllable environment (Boje and Winsor, 1993, Taylor, 1911). However, the practice of project management would suggest that these assumptions are not supported (Hällgren and Wilson, 2008, Hällgren, 2009), and that unexpected events will create deviations from the Initial Plan regardless of how rational, logical and detailed that plan is (Munthe et al., 2014).

Geraldi et al. (2009) note that, by their nature, the types of events which create deviations in documented plans are ex-ante. As a result they cannot be by-passed in advance and so project managers typically address these ex-post, through the development of new plans and courses of action (Munthe et al., 2014).

In their research into the impacts of quality planning on project success, Dvir and Lechler (2004) distinguished between two types of changes that impact on a project's Initial Plan. These changes are Plan-changes and Goal-changes.

Dvir and Lechler (2004) defined Plan-changes as unexpected events “...*induced by the environment...*” (p 4.) which impact on the project plans but not the project's goals. One defining aspect of a Plan-change is that the project manager must address them by making “...*the necessary adjustments **without changing the project scope and goals** [emphasis ours] ...*” (p.4) (Dvir and Lechler, 2004).

In contrast, Dvir and Lechler (2004) define Goal-changes as changes in the project's goals which occur as a result of a “...*conscious decision by the stakeholders to change the goal of the project ...*” (p.4). While the term ‘stakeholders’ is not explicitly defined by Dvir and Lechler (2004), a reading of their work indicates they consider ‘stakeholders’ to be the organisation that requires the project to be undertaken and not the larger project team. For consistency with Dvir & Lechler's (2004) research, we have adopted this definition of stakeholders.

According to Dvir and Lechler (2004), Goal-changes are stakeholder initiated changes; that is, the decision to change the project's goals is generated from within the stakeholder group. Goal-changes can arise for a range of reasons including the incremental expansion in the project scope (i.e. scope creep) (Kuprenas and Nasr, 2003, Giezen, 2012), an increasing understanding of the project details throughout the project life-cycle (i.e. progressive elaboration) (Project Management Institute (U.S.), 2013, Collyer and Warren, 2009, Collyer et al., 2010), or from changing organisational requirements. It is important to note that Goal-changes can also result in changes to the project's plans, however the changes to the plan are a result of a decision made by the stakeholders to amend the project's goals. According to Dvir and Lechler (2004), Goal-changes are usually addressed by collaboration between the stakeholders and the project team.

We believe a third change typology exists, one that was not identified by Dvir and Lechler (2004). This typology changes the project's goals, but is not the result of a conscious decision by the stakeholders. These changes are driven by external influences that do not originate from within the stakeholder group. These external influences could include, but are not limited to, latent conditions, economic conditions, technological advances, and the unavailability of

equipment, resources or materials at the time they are required. Essentially, our definition of an external influence is anything that creates a change in a project's goal that is not a result of a conscious decision by the stakeholder group. These external influences can create Drift-changes⁴ which dictate changes to the project's goals that the stakeholders did not choose, but which they must ultimately accept.

Drift-changes are neither Plan-changes nor Goal-changes, however they do share similarities with both. Drift-changes are similar to Plan-changes in that they are caused by external influences and are not a result of a conscious decision of the stakeholder's to change the project's goals. However, Drift-changes also require changes in project goals, so they do not fulfil the definition of Plan-changes as outlined by Dvir and Lechler (2004).

Drift-changes are similar to Goal-changes in that they change a project's goals. However, Drift-changes are not initiated by the stakeholders themselves, so they do not fulfil the definition of Goal-changes as outlined by Dvir and Lechler (2004).

These types of changes are identified in passing by Söderholm (2008) who noted, "*...our cases show that there are frequent interactions with the environment with an impact on project conditions or goals...*" (p.83). Although this change typology was identified by Söderholm (2008) no further investigation was undertaken into these changes or how these types of changes could be managed.

Our review of the literature has identified that Drift-changes are distinct from Plan-changes and Goal-changes. A flowchart explaining how Drift-changes are different to Plan-changes and Goal-changes is provided in Figure 4-2.

⁴ **Post-publication note:** Following the publication of this article, I have become aware of the work of Baxi (2014) who defines 'Drift' in projects as a process that "*...induces small changes in the project that happen continually over a long period of time...*".

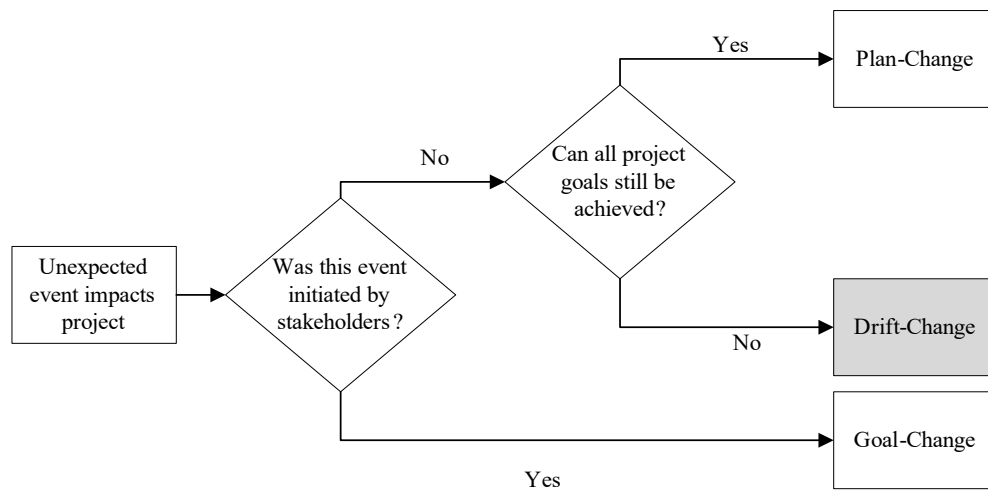


Figure 4-2: Plan-changes, Goal-changes and Drift-changes

4.7.2 Corrective Actions

Within a dynamic project environment, deviations from the project's Initial Plan are inevitable (Perrow, 1999, Terwiesch and Loch, 1999) and these deviations can cause delays and cost overruns (Standish, 2009). Completely eliminating deviations is not possible, however it is the role of the project manager to manage these deviations through corrective actions, in order to reduce the cost, time and quality impacts on the project's goals (Laufer et al., 2015, Hällgren, 2009, Hällgren et al., 2009).

In his paper exploring unexpected events in project management, Söderholm (2008) identified three types of corrective actions that project managers undertake when deviations to the Initial Plan occur. These are Fine-Tuning, Revision, and Re-opening.

Fine-tuning is required due to the constant flow of information that occurs as a result of working in a dynamic environment. Söderholm (2008) does not provide a definition of Fine-tuning in his paper, however a review of his research indicates that Fine-tuning can be considered minor adjustments that a project manager undertakes in order to keep the project aligned with the Initial Plan. When undertaking Fine-tuning, a project manager does not change the project's plan or goals. Söderholm (2008) postulates that one of the main functions of Fine-tuning is to shield stakeholders from environmental disturbances.

Söderholm (2008) found that Revisions are necessary when changes to a project's planning is required. There is no discussion in Söderholm's research about the reasons why this change in planning is required other than to mention that they are inevitable (p. 83). However, it is clear from his research that Revisions are required when *"...a major problem occurs that might jeopardise the success of the project..."* (p.83). According to Söderholm, Revisions are *"...the one single issue requiring the most innovation and on the spot action by the project manager..."* and *"...[Revisions] may require complete reshuffling of resources within the project..."* (p. 83). When discussing Revisions, Söderholm's focus is clearly on re-planning and re-pathing tasks and the re-allocation of resources. In other words, he is investigating changes to the project's plans, not the project's goals.

According to Söderholm (2008), Re-openings are corrective actions which are required when *"...stakeholder's intentions, preferences or internal relationships change...[this may require] a minor change of priorities or a major turn-around..."* (p.83). A Re-opening is required when the project requires a new definition in terms of outcomes, time or cost limitations (Söderholm, 2008). A project manager would adopt the corrective action of Re-opening when the stakeholders need significant changes to the project's goals. Söderholm (2008) only references this type of corrective action when discussing changes in the stakeholder's intentions. In other words, according to Söderholm, a Re-opening is the corrective action a project manager should adopt for stakeholder initiated Goal-changes.

Synthesising the research of Dvir and Lechler (2004) and Söderholm (2008) we see that Fine-tuning and Revisions are undertaken to either re-align a project with the Initial Plan or to re-plan the project to adjust for external influences. The purpose of both these corrective actions is to achieve the originally envisaged project goals. That is, both of these corrective actions address Plan-changes and not Goal-changes. In contrast, the corrective action of Re-opening is undertaken when stakeholders have made a conscious decision to change the project's end-goal. Hence Re-openings address Goal-changes.

4.7.3 Success and Satisfaction

In order to understand how project practitioners address Drift-changes, it is first necessary to understand the concepts of project success and stakeholder satisfaction as they pertain to

project management. Project management researchers and practitioners have long been aware of the duality that exists between the success of a project and a stakeholder's sense of satisfaction with that same project (Rad, 2003, Liu and Walker, 1998). This distinction is addressed by Dvir and Lechler (2004) who investigated project planning in terms of project efficiency and customer satisfaction.

For the purpose of this paper, we define project success as a state that exists when a project can quantifiably demonstrate its performance against metrics that have been pre-agreed (Thomson, 2011, Atkinson, 1999). Traditionally, project managers have used time, cost and quality metrics as the benchmarks for determining project success (Winter and Szczepanek, 2008, Atkinson, 1999). More recently however, additional metrics and critical success factors have been identified to assist project managers to demonstrate the success of their project (Morris and Hough, 1987, Iyer and Jha, 2005, Al-Tmeemy et al., 2011, Han et al., 2012, Shahu et al., 2012).

Despite the promulgation of new metrics and factors to assess a project's success, the underlying tenet is that a project can be defined as successful when sufficient empirical evidence and descriptive statistics can be provided to 'prove' the required outcomes have been achieved against the previously agreed metrics (Construction Industry Institute, 2011, Söderlund, 2011). The evaluation of project success against explicit and measureable factors (Dewulf and Van Meel, 2004) belie this particular definition's positivistic epistemology (Saunders et al., 2012, Edirisingha, 2012).

In contrast, we define stakeholder's satisfaction as the quantum by which the project's final outcome has fulfilled the expectations that the stakeholders had in respect to those outcomes (Dvir et al., 2003, Liu and Walker, 1998, Wuellner, 1990, Liu and Leung, 2002). Unlike project success which is defined objectively, stakeholder satisfaction is a function of the intangible value that the stakeholder has assigned to particular outcomes (Sanvido et al., 1992, Parfitt and Sanvido, 1993). Therefore it is evaluated subjectively (Kärnä, 2014, Barrett, 2000).

We acknowledge that the concepts of project success and stakeholder satisfaction may not be mutually exclusive, and note the work of Yang and Peng (2008) who argue that these concepts may have a reciprocal relationship. However, for the purpose of this paper, it is sufficient to simply draw the reader's attention to the distinction that exists between project success and stakeholder satisfaction.

One of Dvir and Lechler's (2004) findings which we found particularly interesting, was that *"...satisfaction is directly affected only by the quality of planning and goal changes, and not directly affected by plan-changes..."* (p.9). This finding is understandable when we consider that Goal-changes were initiated by the stakeholders and that, by their own definition, Plan-changes do not affect the project's goals. However, Dvir and Lechler's (2004) findings do not provide project managers any assistance for achieving stakeholder satisfaction when they are addressing changes which result from external influences (i.e. non-stakeholder initiated) changes that impact the project's actual, final outcome. That is to say, their findings do not assist project managers who are facing Drift-changes.

4.7.4 Project Trajectories and modes

In 2005, Dorothy Massey introduced the concept of trajectories within the context of the social sciences to assist managers to better understand the process of change within temporary organisations. In the context of the social sciences, a trajectory can be defined as *"...the path followed...by an object..."* (Trajectory, n.d). Utilizing a rationale similar to Massey (2005), a number of researchers have applied the concept of trajectories to projects in order to help conceptualize the path that a project takes as it develops through its own unique space-time state (Aubry et al., 2007, Niss, 2009, Lundin and Söderholm, 2013).

Karrbom Gustavsson and Hallin (2015) use the concept of a project's trajectory to explain the impact that unexpected events can have on a project's temporary organisational structure and to introduce the concept of goal-oriented and goal-seeking modalities within the context of project management. In essence, Karrbom Gustavsson and Hallin (2015) suggest that projects commence their movement through space-time based on the SMART goals⁵ (MacLeod, 2012) established at the commencement of the project. Thus, the project's movement towards a previously determined outcome establishes the project's initial trajectory. According to Karrbom Gustavsson and Hallin (2015) *"...when projects have clear goals, specified by*

⁵ **Post publication note:** MacLeod (2012) notes that *"...SMART goals have become a widely used management tool..."* (p.69). The *SMART* acronym stands for goals that are Specific, Measurable, Achievable, Relevant and Time-bound.

SMART criteria (and hence specified activities, resources and time frames), they may be understood as [being] in a goal-oriented mode... ” (p. 373).

Unfortunately, unexpected events can impact on a project as it moves through space-time (Lundin and Söderholm, 2013, Hällgren, 2009). These unexpected events can create deviations from the project’s initial trajectory causing a shift in focus and creating the need to develop a new trajectory based on the new understanding of the project’s state within space-time (Hällgren and Söderholm, 2010, Hällgren et al., 2009, Karrbom Gustavsson and Hallin, 2015). When these unexpected events create a shift in the project’s trajectory, the project seeks to specify new goals. As Karrbom Gustavsson and Hallin (2015) explain “...*when projects are searching to specify their goals (and hence cannot specify the necessary activities, resources and time frames, i.e. the SMART-criteria) they may be understood as [being] in a goal-seeking mode... ” (p. 373).*

Karrbom Gustavsson and Hallin (2015) highlight that goal-oriented and goal-seeking modes do not represent a dichotomy within the context of project management. Rather, they represent two different states that a project can be in depending on the specific space-time state the project inhabits. In other words, projects can shift between the modes of goal-oriented and goal-seeking depending upon how well the stakeholders and project team can define the project’s goal. As we shall demonstrate later in this paper, the concepts of project trajectory, goal-oriented and goal –seeking modes become essential in understanding Drift-changes and how they are managed.

4.8 Research question

Dvir and Lechler’s (2004) research focussed on the quality of planning in relation to Plan-changes and Goal-changes by investigating whether the quality of planning positively or negatively affected project efficiency and customer satisfaction. Within their research, they identified two types of changes, Plan-changes and Goal-changes. They did not address how project managers should manage the impacts of these changes, nor did they explore changes to a project’s goals that were initiated by influences external to the stakeholder group.

Söderholm's (2008) research focussed on the corrective actions that project managers use when dealing with unexpected events. His research identified three typologies of corrective actions but does not provide guidance on what corrective action should be adopted when dealing with any specific types of change. Through his research Söderholm (2008) identified that "... *interactions with the environment impact on a project's conditions or goals...*". This would indicate the existence of the change typology that we have termed Drift-changes. Although Söderholm (2008) identified the existence of the change typology, it was not the focus of his research so this change typology was not investigated further.

Therefore, there would appear to be a gap in the current body of knowledge that explores how project practitioners identify and manage Drift-changes. Our research addresses this gap by asking:

"How can project managers identify and manage Drift-changes?"

4.9 Research Methodology

4.9.1 Grounded Theory

This research was undertaken using a Grounded Theory (GT) methodology. Glaser and Strauss (1967) recommend a GT methodology is utilized when attempting to generate theory from social processes. We considered GT the most appropriate methodology for our research because we are attempting to provide analytical generalizability (Yin, 1994) from the concepts and relationships that exist in a social construct.

According to Glaser and Strauss (1967), a GT research project should commence with the identification and selection of a specific process or social phenomena for analysis. This should be followed by an iterative process of data collection and analysis which is conducted in such a way as to allow themes and their associated properties to emerge (Glaser, 1978, Locke, 2003, Milliken, 2010). Only once the data collection and analysis has been completed should the findings be compared to the existing background and contiguous literature (Strauss and Corbin, 1990). This is the process we adopted for our research.

4.9.2 Research Methodology

Our investigation commenced with semi-structured, personal interviews with a purposively selected theoretical sample. Our sample consisted of ten project management professionals (four project managers, five Senior Project Managers, and one Project Director) from a single, Construction-focused, project management consultancy. Although not a large sample, this size was considered sufficient for validity based on the research of Algeo (2012) and Mumford and Gold (2004).

The interview participants were all male and had between five and ten years of experience in the Construction industry. At the time of conducting the interviews, all of the research participants were delivering projects in the Australian Construction sector with eight of the participants managing a number of projects concurrently. The participant's Clients (i.e. stakeholders according to our definition in this paper) included eight government departments or agencies (Federal and State), four institutions (education and health) and six private organisations (data centres, retail, residential and commercial). Table 4-3 provides a summary of these projects.

The interviews were digitally recorded and transcribed into Nvivo for data analysis. The recordings, transcripts, and associated data analysis are retained on a password-protected computer. To ensure their privacy the interview participants were given individual designators during the transcription process (PM01-PM10).

Triangulation of the interview data was conducted using an archival content analysis of 69 monthly project reports (MPR01-MPR69). Furthermore, where research participants were asked to make an assessment of stakeholder satisfaction in regards to a project's final outcomes the research participants were requested to provide formal evidence to validate their assessment. As a result, this study also analysed five lessons learned reports, two post-occupancy evaluations, and three project finalization meeting minutes.

The data collected through the interviews and archival review were subjected to a three-phase content analysis (Algeo, 2012). The first phase involved breaking down the data into "thought units" ranging from sentences to paragraphs (Ashill et al., 2003). These thought units were

subjected to a process of open coding (Flipp, 2014). From the open coding process a total of 35 categories were identified. These categories were consolidated through an axial coding process (Wastell, 2001) where the codes were reduced to four themes and nine associated properties. These themes and their associated properties were interpreted through a process of selective coding to identify their relationship with one another and to develop an understanding of the phenomena under investigation (Flipp, 2014).

Table 4-3: Research participant's current projects

Sector	Project Description	Forecast duration	Cost ex GST (AUD)
Federal Government	Project Management of design and construction of hangers, taxiways, airfield lighting, fire-fighting services, General Storage, Specialist storage, multistorey car-parking and office accommodation.	67 months (design to end of Defects Liability Period (DLP))	\$340M
Federal Government	Project Management of design and construction of hangers, taxiways, airfield lighting, fire-fighting services, General Storage, Explosive ordnance storage, roadways bridges and office accommodation.	53 months (design to end of DLP)	\$230M
Federal Government	Project Management of design and construction of hangers, taxiways, airfield lighting, General Storage, workshops and office accommodation	75 months (design to end of DLP)	\$370M
Federal Government	Project Management of construction of warehousing, office accommodation, car-parking, hardstand and enabling infrastructure	18 months (construction to end of DLP)	\$4.2M
Federal Government	Project Management of design and construction Cargo Loading training area, including Warehouse, hardstand, offices, workshops, hardstand and pallet loading facility	31 months (design to end of DLP)	\$82M
Federal Government	Development of Initial Business Case of consolidation of 24 lease-holdings	4 months (no DLP)	\$0.15M
State Government	Project Management of services upgrades including fire, mechanical, and electrical, services and upgrading facility to comply with Disability Discrimination Act requirements.	41 months (design to end of DLP)	\$7.0 M
State Government	Project management of 24 bed demountable geriatric unit in remote central Queensland	22 months (procurement, installation and DLP)	\$2.6M
Institution	Project Management of design and construction for upgrades to existing roadways and increase of landscaping to boulevard	21 months (design to end of DLP)	\$ 4.0M
Institution	Project Management of construction of covered walkways between 6 classrooms	18 months (construction to end of DLP)	\$ 2.25M
Institution	Project Management of design and construction of two storey health clinic including dental surgery facilities	38 months (construction to end of DLP)	\$3.15M
Institution	Project management of design and construction of second storey classroom extension	18 months (design to end of DLP)	\$4.25M
Data Centre	Project management of design and construction of 2N+ production data centre	42 months (design to end of DLP)	\$42M
Retail	Project Management of fitout for restaurant	16 months (construction to end of DLP)	\$2.3M
Residential	Project Management of design and construction of three storey apartments	31 (design to end of DLP)	\$ 4.2M
Residential	Project Management of design and construction of six storey apartments	Project in suspension until Developer secures additional funding	\$20.5M
Residential	Project Management of design and construction of 52 duplex houses, community centre, roadways and associated infrastructure	53 months (design to end of DLP period)	\$52M
Commercial	9000m ² three storey operations centre, including 2N+ data centre	65 months (design to end of DLP)	\$57M

The final stage of this research involved comparing the emergent themes and properties to the existing body of literature to identify areas of commonality and contrast (Milliken, 2010). The final themes and their associated properties outlined in Table 4-4.

Table 4-4: Drift changes themes and properties

Themes	Properties
Expectation	<ul style="list-style-type: none"> • Initial Plan • Initial Expectation
Deviation	<ul style="list-style-type: none"> • External Influences • Interpretation
Corrective Action	<ul style="list-style-type: none"> • Fine-tuning • Revision • Re-opening
Satisfaction	<ul style="list-style-type: none"> • Acceptance • New Expectation

4.10 Research Findings

We now discuss our research findings in terms of the themes and properties that were identified.

4.10.1 Expectation

4.10.1.1 Initial Plan

For deviations to occur there must be, by definition, a plan. We felt it was important to start our investigation by understanding how this plan was developed. We hoped that by understanding the process of developing the Initial Plan, it might provide some insight into how project managers handled changes to these plans. To investigate this, research participants were asked how they developed their Initial Plan for the project.

“...[we get] as much information as possible...we sit down with the Client to understand and get them to articulate how they see the project going or what the requirements are...” (PM02).

“... [we start by getting the Client to] put their needs into descriptive words... ’ (PM06)

“...Once we understand what they want we articulate a methodology as to how we want to go about delivering that project...” (PM04)

The idea that the Initial Plan commences by gaining an understanding of the stakeholder’s needs is hardly ground-breaking. However, within these responses, we see that the Initial Plan is developed by understanding more than just the technical parameters for project success. The participants also mentioned intangible characteristics such as how the stakeholders saw “...the project going...” and the use of “...descriptive words...” as a means to understanding the project requirements. These responses indicate there are certain expectations held by stakeholders in relation to the project process and goals, even before the Initial Plan is codified.

In addition, we can see from the participant’s responses that the project manager has to interpret the stakeholder’s tangible and intangible requirements in order to articulate a methodology which they then put forward as the correct plan for achieving the required outcomes. This interpretation process was witnessed in MPR01, MPR07 and MPR08 where the Initial Plan was presented to the stakeholders as a visual representation of task sequencing and durations, and cost plans. We felt this was important in understanding the process as it introduced a second-order complexity, specifically that it required the project manager’s interpretation of the stakeholder’s requirements.

4.10.1.2 Initial Expectation

Based on the inevitability of changes to the Initial Plan, we asked the research participants whether they felt it was necessary for the project manager to even develop an Initial Plan. All of the research participants indicated that the development of the Initial Plan was required, with some providing an explanation on the benefits and purpose of the Initial Plan.

“...it [the Initial Plan] provides both a benchmark and the expectation regarding the project’s outcomes...” (PM05).

“...You need a baseline... without it you're going to be ineffective...” (PM06)

From the responses, it appeared that one of the purposes of developing this Initial Plan was to provide an opportunity for both the stakeholder and the project manager to align their understanding of the project's goals and create an Initial Expectation of what the project will achieve. This concept of Expectation will become important as we discuss the management of Drift-changes.

An associated concept that emerged from this interview question was the importance of having this Initial Plan agreed and endorsed by the stakeholders at the outset of the project.

"...that [the Initial Plan] is a key document... [so you can go] back to a point where everyone had agreement..." (PM10)

"...once we get an agreement ... it [the Initial plan] becomes a collective [idea], it's no longer my plan, it's our plan..." (PM04)

"...You've got to get their agreement, so if there's ever any issues ... you can go back to and say "look we've done what we all agreed to do. Here is your signature where's the disconnect?"..." (PM06).

Our data indicates that the development of the Initial Plan creates an Initial Expectation for both the stakeholders and the project team. The Initial Plan (IP) outlines the intended process (trajectory, sequence, and resourcing) for delivering the project. At the time of developing the Initial Plan (commencement) the understanding of project participants is that it will deliver the requested project goals and fulfil the stakeholder's expectations for those goals upon completion of the project (IP_E). Therefore, it could be said that the Initial Plan and the Expectation created by that plan define the trajectory of the project at the time of commencement.

The Initial Plan, the anticipated trajectory and resultant Initial Expectation are conceptualized in Figure 4-3.

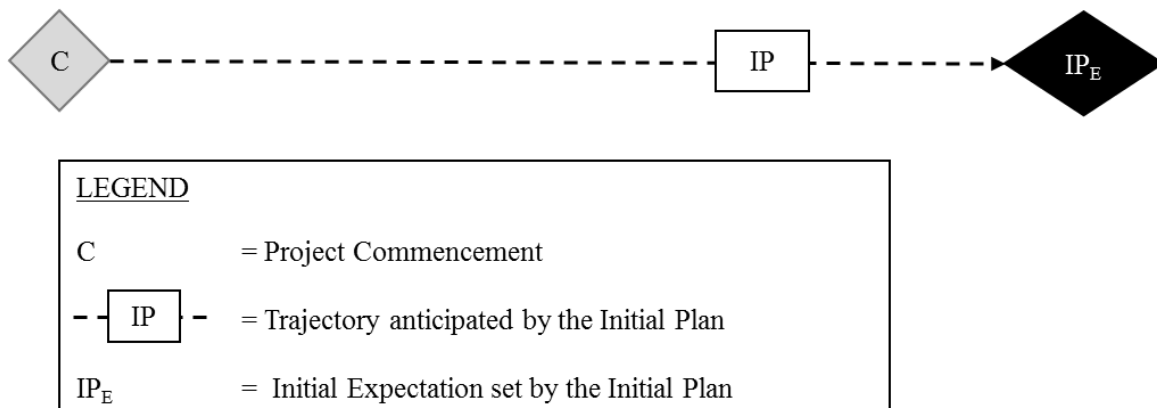


Figure 4-3: Drift change: Initial Plan and Initial Expectation

4.10.2 Deviation

If a project manager can achieve the project goals exactly in accordance with the Initial Plan and trajectory then corrective actions would not be required. Hence, we can deduce that a prerequisite for the existence of corrective actions is a deviation from the trajectory anticipated by the Initial Plan.

The research participants were asked if they had ever been involved in a project where deviations from the Initial Plan occurred. Every one of the participants confirmed this occurred in all their projects.

“...Yes, I would say it [the Initial Plan] changes in all instances...” (PM04).

“...It [the Initial Plan] always changes. Yes, absolutely – every time...”

(PM06).

The responses we received supports the existing literature that unexpected events and deviations from the Initial Plan are, in fact, inevitable.

4.10.3 External Influences

The research participants were asked to explain the source of the external influences on their projects and explain what impact they had on their ability to guide the project towards the previously agreed goals. The respondents noted that:

“...there are changes that the Client wants to make and then there are changes that come from external factors not driven by the Client, but they have to adjust to that... external factors can change everything...” (PM06)

“...[things] come up and that effects what you’re trying to do... It comes back to things like technology, market capacity, economic conditions, geographical issues...” (PM02)

“...there are external influences which can affect outcome...” (PM05).

These responses confirm the existence of deviations caused by external influences which result in changes to the project’s goal. That is to say, the research respondent’s confirmed the existence of Drift-changes.

We also noted that the research participants spoke about how these external influences impacted the project goals in terms of success criteria such as completion on time or cost overruns, however there was no mention of how these external influences impacted the stakeholder’s expectations regarding the project’s goals. In other words, the external influences

have caused the project goals to drift away from the anticipated trajectory established by the Initial Plan, but the Initial Expectation created by that Initial Plan has not shifted accordingly. From this, we hypothesized that one impact of Drift-changes is the creation of a misalignment between the final goals of the project and the Expectations created by the Initial Plan.

4.10.4 Interpretation

The research participants were asked whether they felt their stakeholders understood the potential impact these deviations had on their projects at the time they occurred. The responses indicated that sometimes the stakeholders could see how the external influence and the resultant deviation would impact their project and other times they could not. When the stakeholders could see the potential impact the project managers could immediately commence the corrective actions. However, if the stakeholders could not see the potential impact to the project's final goals, the project manager had to interpret this for the stakeholder before the corrective actions could commence.

"...You need to frame the information in a certain way that enables them to understand what's happening... [they are relying on] your industry expertise ..." (PM10)

"... having reports that represent what's actually happening, rather than just churning out the same stuff every month...[these can be] very useful in helping them look forward and understand..." (PM03)

This process of interpreting the impact of the external influences and clearly demonstrating how these deviations would result in changes to the project's actual final goals appeared regularly in the Monthly Reports.

"...This month's progress claim raises concerns regarding the completion date for [redacted project name]. There is \$ 8,434,216 remaining on the contract, but the Contractor only claimed \$ 604,151 this month. This rate of progress indicates they will not achieve completion by the contracted date for Practical Completion..." (MPR36);

“...The Contractor has not advised the Project Manager of any intended changes to their estimated dates for completion. The Project Manager still estimates that the Contractor’s estimated date ...is incorrect and is forecasting the date for Practical Completion as [redacted date]...” (MPR52)

Through the Interpretation process the project managers appeared to be attempting to directly engage their stakeholders with the challenges and potential risks within the project’s dynamic environment. Furthermore, the project managers appeared to use the interpretation process as a precursor to a shift in the project’s modality from a goal-oriented project to a goal-setting project. The aim of this process appears to be to prepare the stakeholders for possible divergent outcomes and often-times, indirectly proposing amendments to the Initial Expectations (IPE). In other words, the project managers appeared to use the Interpretation process to manage the expectations of their stakeholders regarding changes to the project’s goals long before the resultant effects of the influences can be seen on the project.

4.10.5 Corrective Actions

The research participants were then asked to provide examples from their experiences where an external influence had impacted their project, and more specifically what they did as a result of these influences. We found that the corrective actions outlined by the research participants were able to be classified according to Söderholm’s (2008) three typologies, thereby supporting his findings.

4.10.5.1 Fine-Tuning

Where the research participants considered the impacts of the external influences to require minor adjustments they simply undertook corrective action. These corrective actions were in the form of adjustments to task sequences, costs or resourcing. The outcome of these types of corrective actions were to realign the divergent project path to the anticipated trajectory so that the project still achieved the Initial Expectation set by the Initial Plan.

“...we were able to find a solution within less than a few days, the path, the budget, the quality was still being met because it was done with the relative level of ease - for me that was just fine-tuning...” (PM01)

“...you don't bother the Client with the day-to-day stuff, ultimately that's your responsibility they are paying you to handle those sorts of issues for them...” (PM06)

These findings appear to support Söderholm's (2008) explanation of Fine-tuning, specifically with reference to the role the project manager undertakes to shield the stakeholders from environmental disturbances. Furthermore, the corrective actions outlined by the research participants appear to be describing how they manage the deviations to ensure that the Initial Plans are achieved without changes to the project's goals. This indicates that Fine-tuning is the corrective action adopted when addressing Dvir and Lechler's (2004) Plan-changes, and appears to support their finding that project managers must *“...make the necessary adjustments without changing project scope and goals ...”* (P.4)

The research participants described how external influences can impact the project causing it to drift away from the anticipated trajectory set by the Initial Plan (IP). When this deviation was minor, the research participants described a process of Fine-tuning through which they realigned the actual project trajectory with the trajectory anticipated by the Initial Plan (IP) in order to achieve the originally specified project goals and meet the stakeholder's Initial Expectation (IP_E). Often this was undertaken without involving the stakeholders. The deviations from the anticipated trajectory established by the Initial Plan caused by the external influences and the resultant Fine-tuning corrective actions are conceptualized in Figure 4-4.

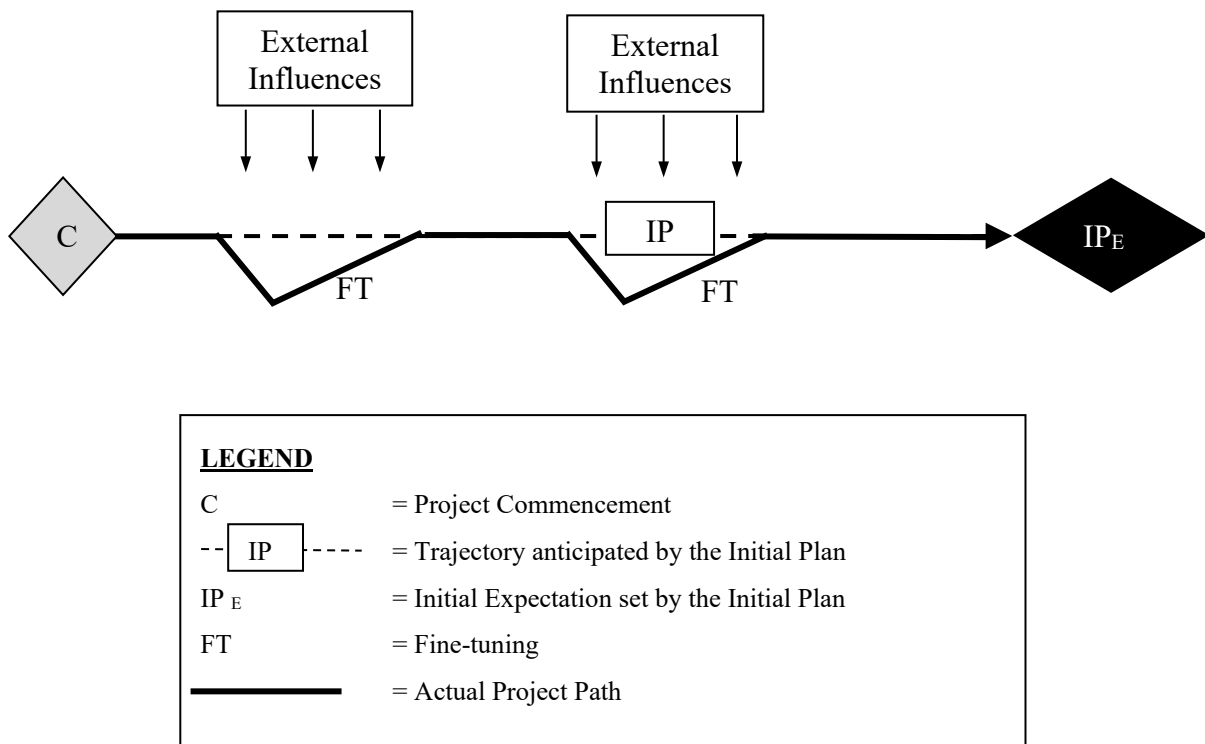


Figure 4-4: Drift change: Fine-tuning

From this data we can see that Fine-tuning addresses deviations which result from external influences by addressing the Plan only. The goals of the project has not changed as a result of the deviation, or of the corrective action undertaken.

4.10.5.2 Revision

The research participants also described occasions when the deviation from the Initial Plan could not be addressed through simple actions or when they felt the necessary corrective action was outside their delegated authority to address unilaterally. When these types of deviations occurred the project managers attempted to revise the Initial Plan (IP) and create a revised trajectory to reach project completion.

“... [if] you are building something it's running late and that critical thing is now impacting the rest the building sequence, that might be the time to do a quick bit of analysis, to go "Right we need to change that, or move this..."
(PM10).

“...The Contractor hadn’t ordered the necessary equipment on time ... we looked at solutions from a time perspective and cost, and basically agreed on an approach. ... We replanned the commissioning phase...the core of the project was achieved on time, but there was stuff around the edges that wasn’t...The Client was OK with that because they knew what we had to do just to get the core work completed on time...”. (PM04).

Our data indicate that project managers utilize Revisions when they believe an external influence will cause a deviation from the Initial Plan’s anticipated trajectory and that this deviation will result in the project delivering goals which are close to those originally specified and envisaged by the Initial Expectation but are not exactly like them. In other words, both the project plan and the project goal have changed slightly.

When explaining the Revision process, the project managers began introducing differential language into their responses, discussing aspects like “...core...” goals, rather than just project goals. This type of language suggests that the project managers use the Revision process to focus their Client’s attention on those parts of the project that are required in order to provide the fundamental capability of the project. We felt this was a form of expectation management by the project manager. They appeared to be suggesting what scope elements could be ‘sidelined’ and delivered differently to the Initial Expectation so that they could still evaluate the project as successful and achieve stakeholder satisfaction despite delivering a project goal that was different to what was originally requested or planned for. We also noticed that the introduction of this differential language appeared to be a precursor to a shift in the project’s modality from a goal-oriented project to a goal-seeking project.

This process of expectation management was seen again when the research participants were asked how they managed the Revision process. The project managers noted that this was conducted as a collaborative decision between the project manager, the project team and the stakeholders. This is different to the unilateral approach taken during a Fine-tuning.

“...The decision [to revise] was done with all three [the Client, Project Manager, and Contractor]. All three parties were in the room. We discussed

it, came up with the agreed approach and agreed that was the best way to work through the problem...” (PM01)

“... it [the revision] was a group decision... it’s a consultation ... rather than a dictatorship with no decisions made in isolation... I don’t think either party making that decision in isolation ...would benefit the project...” (PM06).

The process of explaining the impacts of the external influences resulted in a Revised Plan being developed, accepted and endorsed by the stakeholders. The acceptance of this Revised Plan by the stakeholders results in setting new expectations, either implicitly or explicitly, regarding the project’s final outcome (RP_E). Once the Revised Plan was developed and endorsed the project shifted back to a goal-oriented mode with the project manager focussing on how to deliver the project’s new goal based on the project’s new trajectory.

However, even revising these plans and creating this new expectation does not guarantee the final project goals will be achieved as anticipated.

“...I think inevitably they [project outcomes] do change, and they can change right at the last minute - and that’s just a fact of life. I don’t think that there’s anything that you can do to particularly stop that...” (PM05).

From this, we see that it is possible that the project’s actual trajectory can result in a Final Outcome (FO_{ACT}) which is different, not only to that anticipated by the Initial Plan (IP) but also from goals anticipated by the Revised Plan (RP). This deviation in trajectory anticipated by the Initial Plan (IP), the Initial Expectations (IP_E), the development of a Revised Plan (RP), the new trajectory, and the actual final outcome of the project (FO_{ACT}) are conceptualized in Figure 4-5.

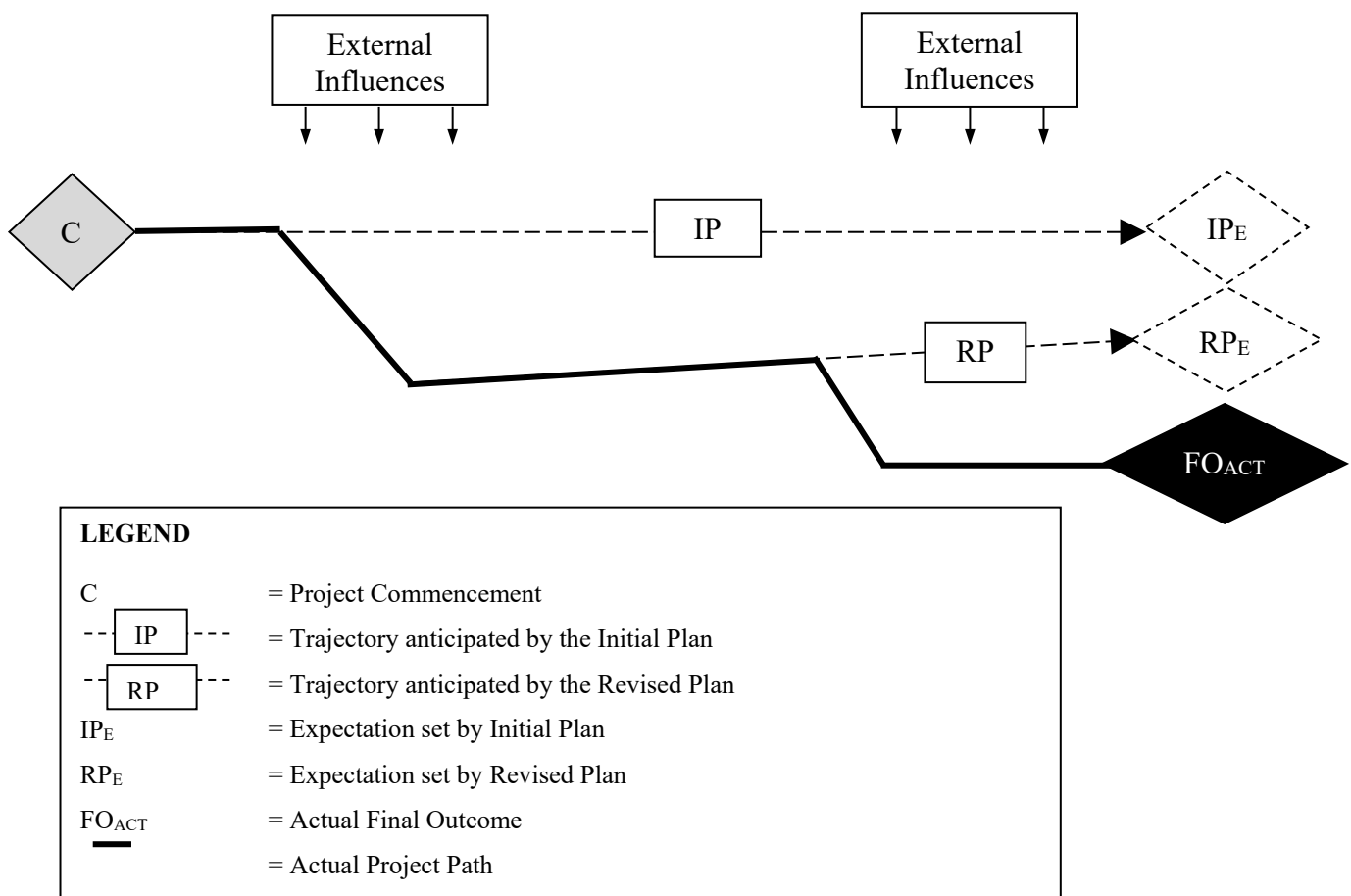


Figure 4-5: Drift-changes: Revisions

4.10.5.3 Re-openings

The data indicates that there are occasions when the external influences on a project are so large, and the resultant deviation from the Initial Plan's anticipated trajectory is so great, that the project manager considers the project can no longer achieve the original project goals. When these events occur no amount of Fine-tuning or Revision will bring the final project goals within the previously agreed parameters, so the project managers attempted to re-open the project and have the stakeholders create a new definition regarding the project's goals.

"...everyone can deal with a certain amount of movement. As long we know the try line is there, as long as I'm scoring a little bit away from the goalpost it's okay, but if I'm going to score right out near the wing and then I've got to try kick from there well then that's a bit more awkward and we need to have a formal occasion where we move the goalposts..." (PM07).

“...the impact to the budget was too big...[the only option was] redefining the brief ...”. (PM06)

When these types of events occur, the project managers considered the required corrective action to be so far outside their mandate that the ultimate decision was no longer a collaboration, but a decision which the stakeholders alone had to make.

“... ultimately the decision needs to come from the Client on how they wish to proceed... a number of options will be presented to them and each one is feasible, but it depends on what the Client’s decision is...”. (PM04)

“...At that point the role for us [Project Managers]... is not to make the decisions; our role is to give advice to the Client so that they can make an informed decision...”. (PM09)

The process of Re-opening appeared to be similar to a Revision in that a new plan is required, but the change necessary was so great that the project manager was unable to find a new trajectory within the existing parameters, and so they believed a redefinition of the project’s goals was required. We saw evidence of this in a number of Monthly reports and were surprised how often this type of corrective action occurred, as we suspected it was an unusual course of action to undertake.

“... as a result of the Contractor’s failure to procure equipment on the project’s critical path, [firm name redacted] is advised that the Date for Practical Completion cannot be achieved by the IT Freeze date...” (Extract from MPR 22).

“...The forecast cost to complete is now \$12,897,854 (inc GST) (+15%) in excess of the approved budget...” (Extract from MPR33).

“...[The Project Manager] seeks guidance from [firm name redacted] regarding their intent regarding scope reduction now that the ‘Preferred

Tender's' submission exceeds the \$ 4.0M limit in the approved Negotiation Plan... ” (Extract from MPR59)

Within the process of a Re-opening, we saw the project modality shift once again from goal-oriented to a goal-seeking. The Re-opening process appeared to address the deviations to both the pre-agreed success criteria, and the stakeholder's expectations regarding the goals of the project. When the project manager forecasts that the project's goals could no longer be achieved within the existing parameters, they undertook a similar process to that which they used to develop the Initial Plan. That is, rather than entering into a collaborative decision-making process with the stakeholders, they simply advised the stakeholders of the current position of the project and investigated what parameters the stakeholders would be willing to amend (goal-seeking). Once this process was complete the project managers created a new project trajectory by linking the current state of the project to the new expectations, through the new plan. Once the project managers got acceptance and endorsement by the stakeholders of the new plan, trajectory and expectations, the project shifted back into a goal-oriented mode to allow the project manager to execute of the Re-opened Plan.

We found this process interesting as it essentially reset, not only the plan, but also the stakeholder's Expectations regarding the project's goals. Furthermore, the Re-opening process involved the stakeholders endorsing the changes, which often included acceptance of project goals that they did not request or envisage at the commencement of the project. Thus we see that the Re-opening is used to address changes to both the projects plans and the project's goals.

As with a Revision, this new Plan and Expectation does not guarantee that new external influences will not impact the project's goal before completion. Therefore it is possible, even following a Re-opening, that the actual trajectory of the project results in final outcomes (FO_{ACT}) that differ from those anticipated by the Re-opened Plan. The Initial Plan (IP), the Initial Expectation (IPE), the development of a Re-opened Plan (ROP), the new setting of new expectations (ROP_E), and the actual final outcome (FO_{ACT}) are conceptualized in Figure 4-6.

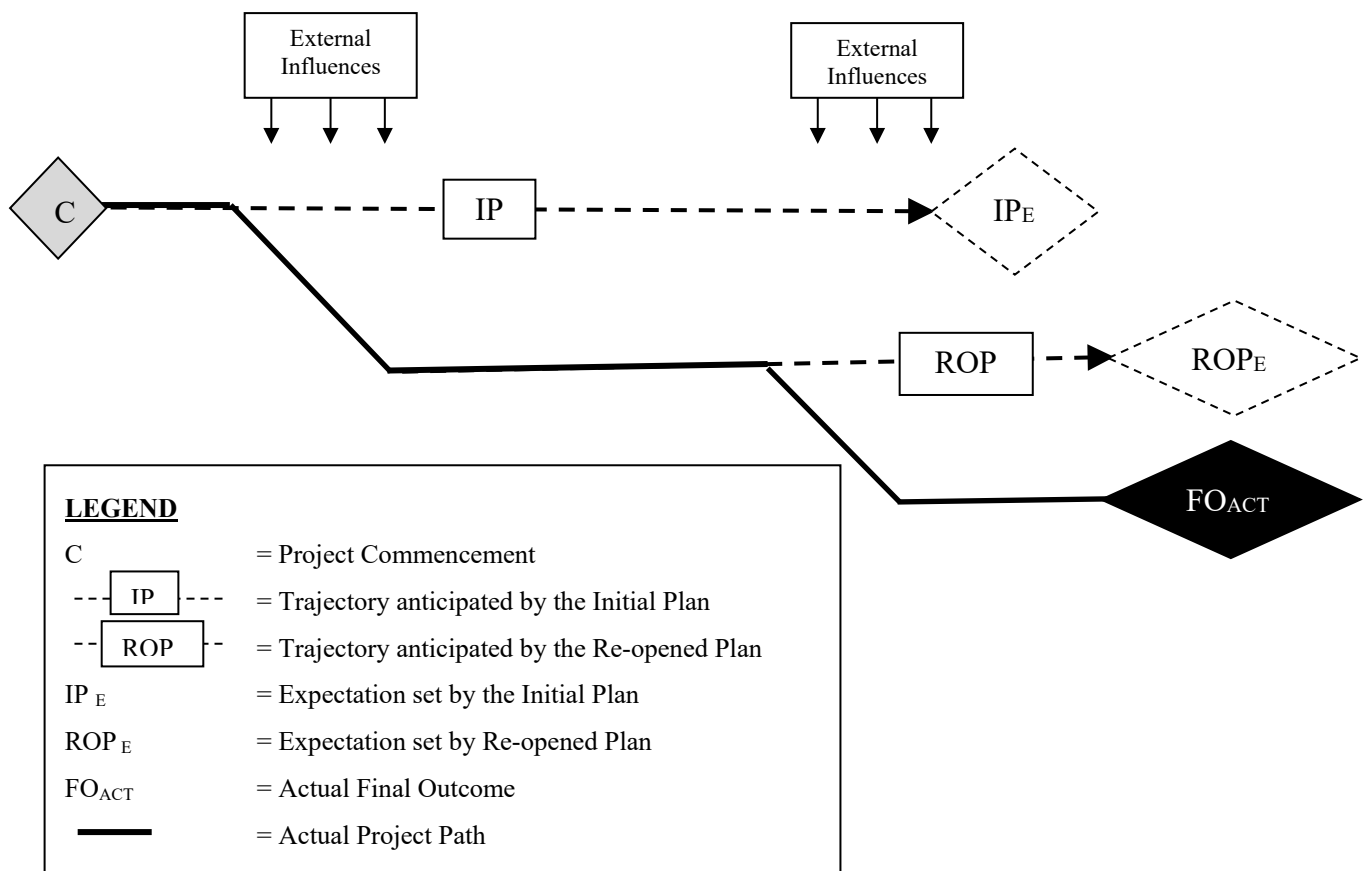


Figure 4-6: Drift-change: Re-opening

4.10.6 Satisfaction

4.10.6.1 Acceptance

Our data regarding Revisions and Re-openings appears to indicate that stakeholders could be satisfied with changes to project goals that they didn't initiate and that were not originally requested or envisaged when the Initial Plan was developed. We investigated this further by asking the research participants how important they felt this redefining of expectations was during these processes.

"...If we didn't manage their [the Client] expectation... the shock they would have got, when they saw it, when their expectations was still way back three years ago; they probably wouldn't have liked it as much, but because they

bought into it and understood it, and they've invested themselves emotionally and aesthetically into it, it was a success..." (PM06)

"...you need to have their acceptance ...that's an emotional point of the people involved. And that outweighs the cost, and the money, and the time. You can run late, you can go over budget, but if you haven't got the acceptance for doing those things, and have emotional buy-in then you can end up with failure...so it's fundamental. If you can sell the change then, in their minds, the new outcome is exactly right. ...". (PM10)

4.10.6.2 New Expectations

In order to be satisfied with a new project goal, the stakeholders must elect to reassess their expectations in regard to that goal. Essentially, the stakeholders redefine their expectations about what the project will achieve and accept a new trajectory and project goal. The expectation set by the Initial Plan (IPE) is superseded by a new expectation regarding the project's goals.

"...Everyone had been on the journey...; so no surprises...and that ... process made sure that though the inputs changed, the outputs satisfied the most recent set of inputs...what we ended up with, it was very, very different - but they love it..." (PM06)

"... [because you made] sure that the Client is going on the journey with you...even if they are not happy, they know why they're not happy, it's because they are only getting three rooms and not four, or something has been value-managed out; but they've seen the process and they're happy with the process, even though that might not be happy with the outcomes - so everyone feels good.." (PM07)

Our data indicates that creating a new expectation about the goals of the project becomes the basis for the stakeholder's sense of satisfaction with the project's final outcomes. By creating

a new expectation regarding the project's goals, the stakeholders assigns a different set of values to the outcomes and assesses the project in relation to these, rather than those originally anticipated at the commencement of the project.

4.11 Discussion

Before entering into a discussion of our findings in relation to our research question, we wanted to acknowledge that the diagrams presented in our paper are a simplified representation of complex events. There are any number of variations possible within the three broad categories of Fine-tuning, Revisions and Re-openings that can occur within a single project. Whilst we note these variations, we felt trying to include every possible variation within the diagrams presented complexities that distracted from our core findings.

4.11.1 Identifying Drift-changes

Drift-changes are defined in this paper as changes to a project's goals that result from external influences that are not initiated from within the stakeholder group.

Therefore we see that the first criterion for identifying a Drift-change is whether the unexpected event was initiated by the stakeholders. If this change was initiated by the stakeholders, then the project is undergoing a goal-change.

The second criterion for identifying a Drift-change is whether all the project goals can still be achieved, in spite of the unexpected event. If the project goals can still be achieved the project is undergoing a Plan-change, if the project goals cannot be achieved as a result of the unexpected event, then the project is undergoing a Drift-change. However, if the project manager is not sure if the project goals can still be achieved, they should attempt a Fine-Tuning. If the Fine-tuning allows the project to achieve its goals, the project is undergoing a Plan-change, if not then the project is undergoing a Drift-change. This process is demonstrated in Figure 4-7.

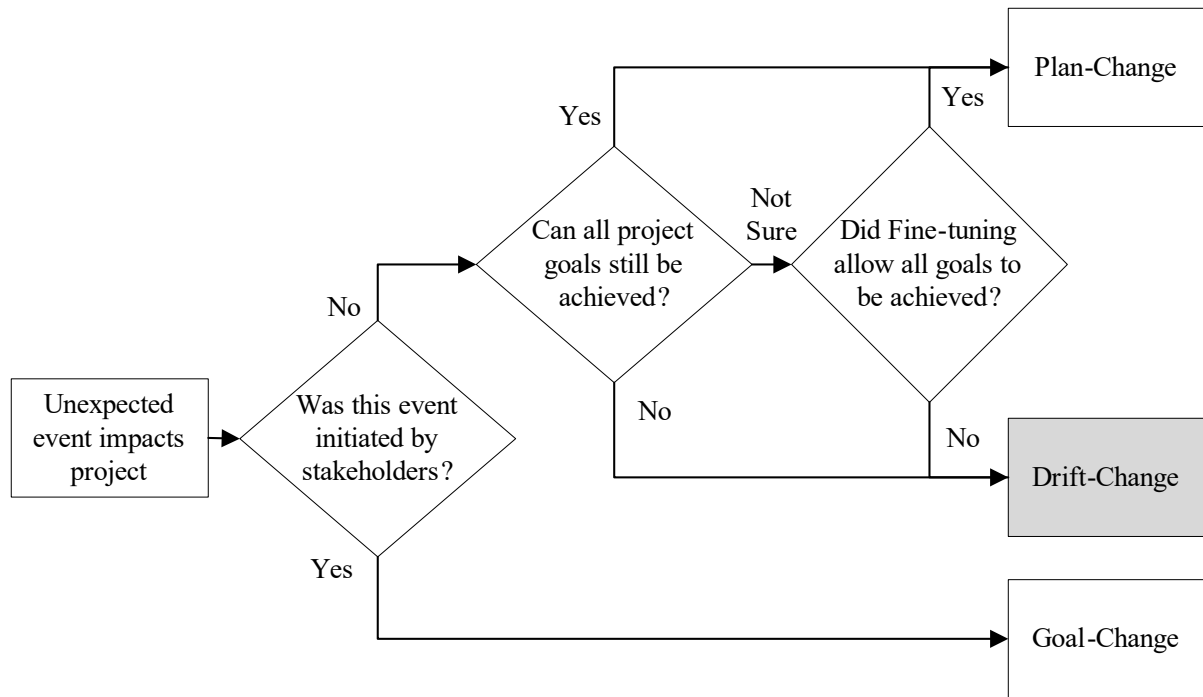


Figure 4-7: Identifying a Drift-change

4.11.2 Managing Drift-changes

Our research found that a fundamental concept in managing Drift-changes is the shifting of project modes from goal-oriented to goal-seeking and back again, in order to create new goals, trajectories and expectations. Furthermore, our research found that Drift-changes cannot be managed through Fine-tuning, they can only be managed through Revisions and Re-openings.

4.11.2.1 Shifting project modes

Our research found that project managers manage Drift-changes by shifting the projects from a goal-oriented mode, to a goal-seeking mode, and back again. This modality shift is undertaken because external influences have ‘pushed’ the project off the anticipated trajectory and the project manager cannot realign the project with the trajectory established by the Initial Plan and the Initial Expectations through Fine-Tuning.

We found that when an external influence has caused a project to ‘drift’ to such an extent that the project manager feels they can no longer achieve the project goals established within the Initial Plan, they begin to prepare the stakeholders for deviations by interpreting the impact of the external forces in such a way that the stakeholders can see for themselves how the project goals cannot be achieved. This process allows the project manager to enter a goal-seeking mode using either a Revision or a Re-opening.

In addition, our research found that once the Revision or Re-opening process was completed, the project managers shifted the project back into a goal-oriented mode so that they could demonstrate how project success is being achieved against the new performance criteria.

4.11.2.2 *Revisions*

Our research found that Revisions are one possible corrective action typology that a project manager can adopt when faced with Drift-change. When the project manager feels the Drift-changes are minor, the project manager will re-plan the project to achieve goals that are as close as possible to the original project goals envisaged by the stakeholders at the time the Initial Plan was developed.

The Revision process involves the interpretation of information by the project manager who uses their expertise and experience to forecast whether the external influences which have impacted the project will result in an outcome that is different to the one anticipated by the Initial Plan. Our research indicates that when a project manager believes a Drift-change might occur, they begin to manage the stakeholder’s expectations by suggesting that certain project goals might be considered ‘core’ project goals while other project elements might be able to be ‘sidelined’, and thereby removed from considerations regarding the assessment of the project’s success and stakeholder satisfaction. A project Revision is undertaken in collaboration with the stakeholders and results in the development of a Revised Plan, a Revised trajectory and a Revised Expectation regarding the project’s goals.

4.11.2.3 *Re-opening*

Our research indicates that the other corrective action that project managers adopted when addressing Drift-changes are Re-openings. Entering into a Re-opening is essentially an

admission by the project manager that the project goals, agreed at the commencement of the project, are no longer achievable.

Similar to a Revision, when adopting the Re-opening as the corrective action, the project manager interprets the information and forecasts whether the external influences which have impacted the project will result in an outcome that is no longer achievable using the Initial Plan or envisaged by Initial Expectations. However, in contrast to a Revision, when adopting the Re-opening as a course of action the project manager does not work collaboratively with the stakeholders to resolve the issue, rather they appear to only provide decision support and advice. The actual decision regarding the redefined parameters (goal-setting) is left with the stakeholders themselves to make. Once the stakeholders have made the decision to redefine the required project parameters, the project managers become instrumental in developing a Re-opened plan, re-gaining consensus regarding the Expectation set by the Re-opened plan, and establishing a new trajectory.

4.11.2.4 *Drift changes, Project Success and Stakeholder Satisfaction*

Similar to Plan-changes and Goal-changes, managing Drift-changes requires technical expertise in order to be able to understand, interpret and forecast the impact that external influences may have on a project's goals. These technical skills provide the construct necessary to achieve project success, which we have defined in our paper as the completion of a project's goals in accordance with pre-agreed performance metrics.

However, the management of Drift-changes differs from Plan-changes and Goal-changes in the area of expectation management, which we see as a pre-requisite for stakeholder satisfaction. When Plan-changes occur the project manager must make “...*the necessary adjustments without changing the project scope and goals [emphasis ours]*...” (p.4) (Dvir and Lechler, 2004). Where there is no change to the goal there is no misalignment between the project's final goal and the stakeholder's Initial Expectation. Therefore, there is no need for the project manager to adjust the stakeholder's expectations in relation to the project's goals when addressing a Plan-change.

When Goal-changes occur these are made through a “...*conscious decision by the stakeholders to change the goal of the project*...” (p.4) (Dvir and Lechler, 2004). Goal-changes are initiated

by the stakeholders, so the stakeholder's expectations have shifted before they advise the project manager of the need to change the project's goal. In terms of our findings, we could say the change from the stakeholder's Initial Expectation regarding the project's goals proceeds the change from the Initial Plan.

Neither of these are the case with Drift-changes where the project's goal has been impacted, but not as a result of a stakeholder-initiated request. Hence, Drift-changes create the potential for misalignment between the project's actual final outcomes and the expectations that the stakeholders have in relation to those outcomes.

Our findings indicate that one of the key purposes of undertaking a Revision and Re-opening is to provide an opportunity for the project manager to shift the project to a goal-seeking mode in order to reset the stakeholder's expectations regarding the project's goals. If the Revised Plan (RP) or Re-opened Plan (ROP) is accepted and endorsed by the stakeholders the project shifts back into a goal-oriented mode and the stakeholder's expectations are adjusted from the Initial Expectations forecast by the Initial Plan (IP_E) to those anticipated by the Revised Plan (RP_E) or the Re-opened Plan (ROP_E).

We found this particularly interesting as it suggests that although a project's actual final outcome (FO_{ACT}) can 'drift' significantly from the stakeholder's Initial Expectations (IP_E) it does not necessarily follow that the stakeholders will be dissatisfied with these results.

The importance of managing the stakeholder's expectations during a Drift-change can be seen in the Revision (Fig 4-8) and Re-opening (Fig 4-9) processes. The actual Drift-change (DC_{ACT}) that has occurred in the project can be much greater than the difference between the stakeholder's Expectations that result from the Drift-change (DC_{EXP}), provided the project manager has managed the stakeholder's Expectations through the Revision or Re-opening process (RP_E/ROP_E).

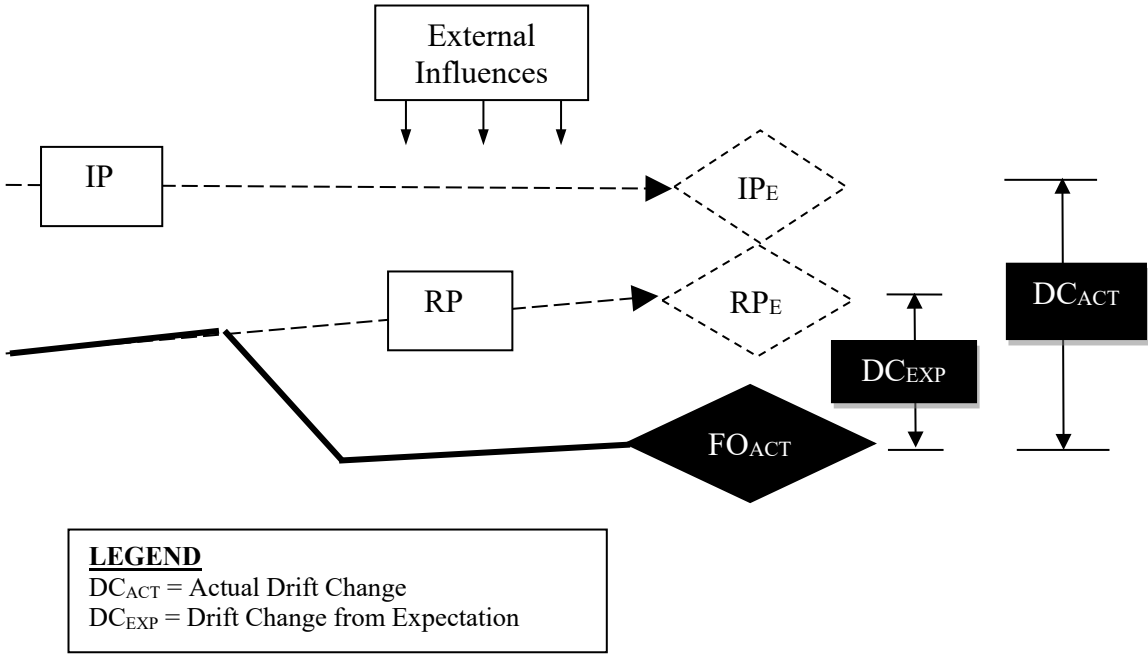


Figure 4-8: Drift-change: Expectation Management in a Revision

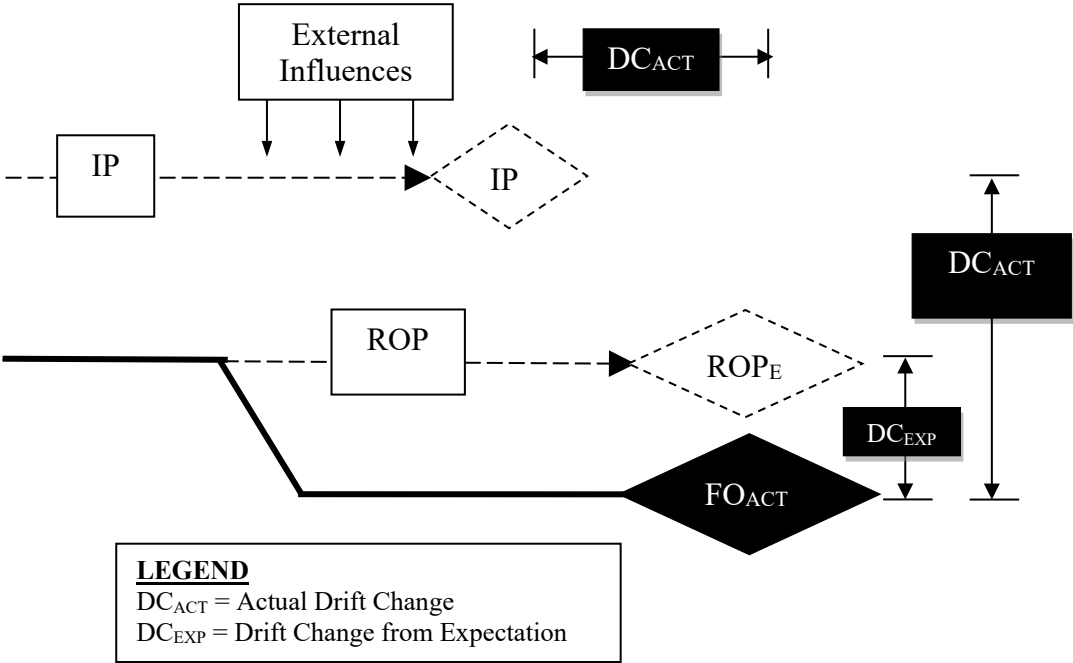


Figure 4-9: Expectation management in a Re-opening

Based on this finding, we suggest that when a project has ‘drifted’ from the Initial Plan (IP) to such a point that a Revision or a Re-opening is required, there may be more value in the project manager working to shift the project to a goal-setting mode to allow the stakeholder’s expectations from their Initial Expectation (IP_E) to an adjusted Expectation (RP_E , or ROP_E) than there is in applying energy and resources into driving a project towards the originally anticipated project goals.

Our research indicates that stakeholder satisfaction can still be achieved despite large deviations (‘drift’) between the Initial Expectation (IP_E) and the project’s actual final outcomes (FO_{ACT}) provided the project manager adjusts the stakeholder’s expectations through either a Revision or Re-opening process (RP_E or ROP_E).

The re-evaluation and acceptance of revised project goals (i.e. the shift to goal-setting mode) that occurs during these processes means that the originally stated project goals are superseded in the stakeholder’s mind and their sense of satisfaction is now linked to the delivery of the most recently accepted project goals. This creates a construct whereby a stakeholder can be satisfied with project goals that are considerably different to those envisaged at the commencement of the project, even though they did not initiate these changes.

It is this need to manage the stakeholder’s expectations that provides the key to understanding the management of a Drift-change. As we have demonstrated in this paper, Plan-changes do not affect stakeholder’s expectations and therefore do not impact on stakeholder satisfaction. When Goal-changes occur, these are a result of stakeholder-initiated changes so the change in stakeholder’s expectation proceeds the change in the project’s goals. However, in the case of a Drift-change, the change in project goals is being dictated by an external influence that is not initiated by the stakeholders. As a result, a misalignment can occur between the project goals that the stakeholder's expectations.

Our research has highlighted the importance of managing stakeholder expectations when Drift-changes occur through the shifting of project modes. Interestingly, the focus on adjusting the stakeholder’s expectations does not appear to be necessary for either a Plan-change or a Goal-Change. The flowchart in Figure 4-10 demonstrates why the management

of stakeholder expectations is only necessary when a Drift-change occurs, and how this expectation management is achieved through a shift in project modality.

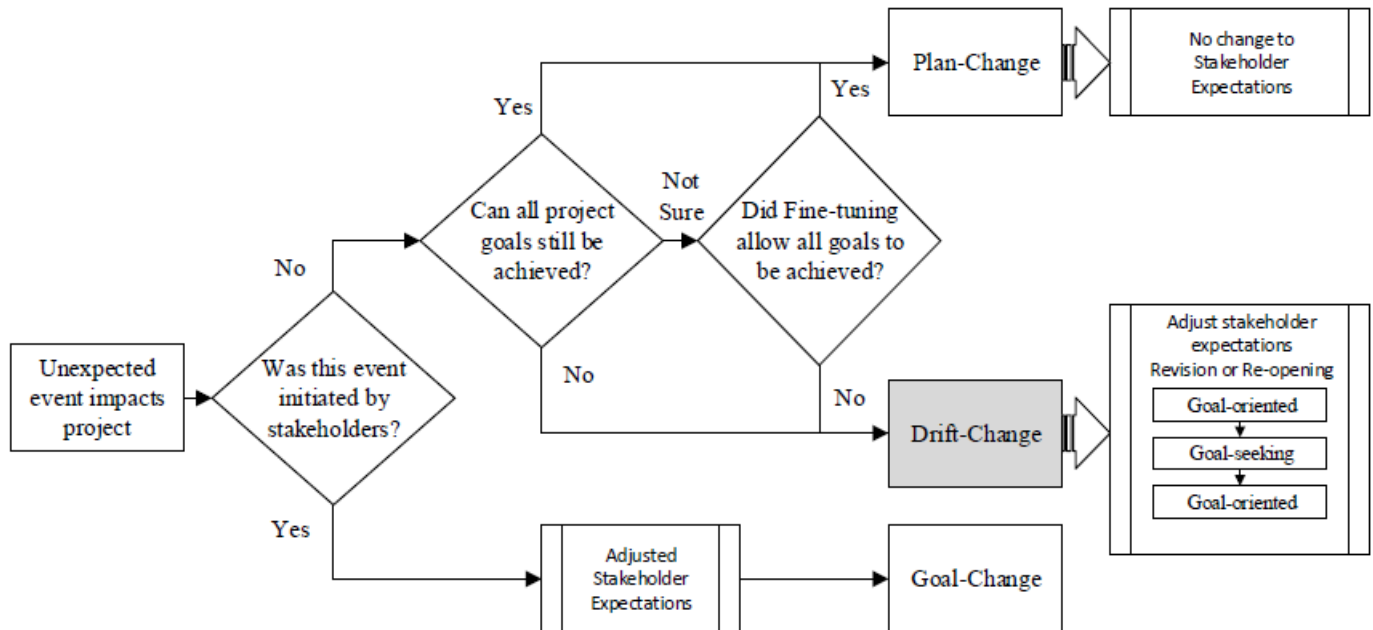


Figure 4-10: Why stakeholder expectation management is only necessary for a Drift-change, and how this is achieved.

From our research findings, we have been able to demonstrate:

- (i) The existence of Drift-changes;
- (ii) How to identify Drift-changes; and
- (iii) How to manage Drift –Changes.

Our findings have been summarized in Table 4-5 to assist project management practitioners in the identification and management of Drift-changes.

Table 4-5: Identifying and managing Drift-Changes

Identification			Management	
Cause	Impacts	Change type	Corrective action to adopt	Stakeholder's expectation
External influence	Plans only	Plan-change	Fine-tuning	No adjustment required
External influence	Goals and plans	Drift-change	Revision or Re-opening	Adjustment required — Shift modes
Internal influences	Goals and plans	Goal-change	Revision or Re-opening	No adjustment required

4.12 Conclusions

This paper investigates a phenomena which it terms Drift changes. Drift changes occur when external influences impact on a project's goals. Drift changes impact on a project manager's ability to deliver the project goals they were commissioned to deliver. They can also cause projects to deliver outcomes that were not envisaged by the stakeholders at the commencement of the project.

Our research investigated how project managers can identify and manage Drift-changes. Our research highlights the importance of managing the stakeholder's expectations when a Drift-change occurs, and how this is achieved through using a Revision or Re-opening to shift the project from a goal-oriented mode to a goal-seeking mode, and back again. We found that Fine-tuning is not a corrective action that addressed Drift-changes, but Revisions and Re-openings are.

Our research found that re-pathing and re-planning a project as a result of Drift-changes may provide the basis for project success, however the project manager must also manage the impacts that the Drift-changes have on the stakeholder's expectations if they wish to increase the probability of stakeholder satisfaction with the project's actual final outcomes.

4.12.1 Limitations and Challenges

This research was conducted with a small sample selected from a single consultancy firm. While the interviews included accounts of work prior to the research participant's employment with this firm this may not have completely removed the impact of the firm's cultural bias on the research results. Furthermore, all the research participants were male and this may introduce a gender-bias into the research findings. In addition, because the research participants are all employed by the same firm there was limited diversity in project typology. Although individual research participants were working on different projects, this firm's Clients tended to be large government, institutional and private sector entities. This may have an impact on the findings of this research.

While there appeared to be a breadth of literature relating to the topics of dynamic environments, project success, and stakeholder satisfaction we could not identify any additional research specifically addressing the corrective actions of Re-opening, Revisions and Fine-tuning outside the work of Söderholm (2008). Google Scholar identified 128 citations of Söderholm's research [accessed 05 July 2016], but a review of these related articles did not produce any further research in relation to these particular concepts. The paucity of literature regarding the typologies of these corrective actions creates limitations our research.

Our research includes investigation of stakeholder's satisfaction with final project outcomes. According to our own definition this is the result of subjective evaluation. We attempted to remove the research participant's personal bias from our research by only investigating projects where formal project finalization processes, such as lessons learned workshops, client feedback surveys and post-occupancy evaluations of the facilities had been undertaken. Unfortunately, the only way to access this information was through the project managers themselves. Hence, there is the potential that the findings of our research may have been impacted by the research participant's disclosure of projects in which they felt their stakeholders were satisfied. This limitation could be overcome in future research by directly engaging with stakeholders to obtain a first-hand assessment of their satisfaction.

For the reasons outlined above, we caution against generalizing the findings of this research to the wider project management profession.

4.12.2 Implications for research and practice

Drift-changes impact on the project manager's ability to deliver the project goals they were commissioned to achieve. For this reason, our findings have implications for both project management academics and practitioners.

Our research investigated a gap that existed between Dvir and Lechler's (2004) research and Söderholm's (2008) research and identified Drift-changes as a third possible type of change that can occur in the management of projects. Our research also discussed the management of these types of changes. We do not believe this type of change has been investigated through

any other research, and so we feel opportunities exist for academics to conduct additional research into this phenomenon in the hope of better understanding these changes and how they can be managed.

A second avenue for future research could be to explore the concepts of Re-opening, Revision and Fine-tuning identified by Söderholm (2008) in more detail. As noted in our limitations, we found minimal subsequent research in relation to these corrective actions. A more detailed understanding of when and how project managers decide to undertake these three different corrective actions may further develop our understanding of managing dynamic project environments.

For project management practitioners our research has identified that Revisions and Re-openings are potential management actions that can address Drift-changes. Our research demonstrates that simply managing the technical aspects is only partially managing Drift-changes. Project managers need to understand the impact that Drift-changes can have on their stakeholder's expectations regarding the project's goals and ensure they are actively managing this component of the Drift-change as well, by using Revisions and Re-openings to shift their projects to a goal-seeking mode to create new project trajectories.

5 Project Management Yinyang: Coupling project success and client satisfaction.

5.1 Structure Map

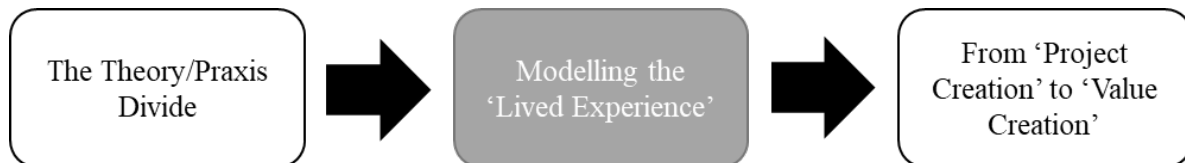


Figure 5-1: Thesis structure map (Chapter 5)

5.2 Preface

This chapter provides the full, accepted manuscript from an empirical, peer-reviewed paper developed as a result of this doctoral research. This paper, titled “Project Management Yinyang: Coupling project success and client satisfaction”, was published in *Project Management Research and Practice*. This paper develops the concept of duality that began to emerge in Chapter 3. Although the idea of yinyang might appear out of place in a discussion about project management, this paper was instrumental in helping me understand the nature of duality that existed between ‘project success’ and ‘client satisfaction’. This paper also helped me better understand my own ‘lived experience’ as a client-side project manager in the Construction sector by exposing the different ontological perspectives, systemic discourses and language games which operated in the practice of project management.

5.3 Key points of this chapter relevant to this thesis

Table 5-1: Key themes of Chapter 5 relevant to this thesis.

- Systemic discourses and language games.
- The existence of dualities within client-side project management.
- The importance of structural coupling to manage these dualities.
- The need for Focus and Convergence.

5.4 Citation and Co-author details

Table 5-2: Citation details of original publication

Citation details	Usher, G. & Whitty, S. J. (2017). "Project Management Yinyang: Coupling project success and client satisfaction". <i>Project Management Research and Practice</i> , Vol. 33 No.5, Jan-Jun 2017.
# of times cited	2
Writing	Greg Usher (90%); Dr S.Jon Whitty (10%)
Data collection and analysis	Greg Usher (100%)
Quality Review	Greg Usher (80%); Dr S.Jon Whitty (20%)

Citation details from Google Scholar, as at 31 July 2018.

5.5 Abstract

Our research applies paradox theory to a project management construct to help project management researchers and practitioners understand the tensions that can exist between project success and client satisfaction. Our research highlights that although project success and client satisfaction are both present within a project management construct, they also belong to different functional systems. Project success and client satisfaction have different systemic-

discourses and use different language games to convey information. These distinctions can create latent and sometimes salient tensions within the project management construct that project managers must understand, embrace, and work with.

We have used a Grounded Theory (GT) methodology to explore the lived experience of project managers, and from this have identified a phenomenon which we have termed project management yinyang.

Project management yinyang is the state that exists when both project success and client satisfaction are tightly coupled within the project management construct. Project management yinyang highlights that these two phenomena cannot be viewed as separate elements because the ‘seed’ of each exists within the other. And to truly achieve one, you must also achieve the other.

Our findings indicate that in order to create project management yinyang the project manager must embrace a paradoxical yet holistic philosophy. They must understand the complementarity, interdependency, and structural coupling that exists between the positivist and interpretivist paradigms within the project management construct. They must understand how satisfaction (Yin) and success (Yang) are created through focus. Furthermore, they must understand how project management yinyang is separate from, but borne from, the convergence of the other two elements.

5.6 Introduction

Our research applies paradox theory to a project management construct to help project management researchers and practitioners understand the tensions that can exist between project success and client satisfaction. Our research highlights that although project success and client satisfaction are both present within a project management construct, they also belong to different functional systems (Luhmann, 1995). Project success and client satisfaction have different systemic-discourses and use different language games to convey information

(Wittgenstein, 2010, Seidl, 2006). These distinctions can create latent and sometimes salient tensions within the project management construct (Putnam et al., 2016) that project managers must understand, embrace, and work with.

Project management researchers are already aware of a duality that exists between the success of a project and the project participant's sense of satisfaction with the same projects (Rad, 2003, Liu and Walker, 1998). The former assessment is made in reference to predetermined quantitative metrics, whilst the latter is assessed against a range of qualitative and necessarily subjective measurements (Liu and Walker, 1998, Lipovetsky et al., 1997). The former is based on a positivist epistemology that necessarily requires quantitative data (external to all participants) to determine whether the project is a 'success'; the latter is based on an interpretivist epistemology and assesses 'satisfaction' based on how well a project's outcomes meet the perception of value that the project participants have internally assigned to them (Dvir and Lechler, 2004, Liu and Walker, 1998, Liu and Leung, 2002, Leung and Liu, 1998).

Both the positivist concept of success and the interpretivist concept of satisfaction are well documented. However, in terms of the project management construct, there remains a recognised but not completely understood structural coupling between them. We believe there is a gap in the current body of knowledge to adequately explain the integration between these two concepts within the project management construct. We have used a Grounded Theory (GT) methodology to explore the lived experience of project managers, and from this have identified a phenomenon which we have termed project management yinyang.

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complementarity, interdependency, and structural coupling that exists between the positivist and interpretivist paradigms within the project management construct. They must understand how satisfaction (Yin) and success (Yang) are created through focus. Furthermore, they must understand how project management yinyang is separate from, but borne from, the convergence of the other two elements.

5.7 Background and contiguous literature

5.7.1 Yinyang

Yinyang theory is a fundamental principle in Taoism (Bai and Roberts, 2011). Taoism emphasises a holistic study of the universe and provides a strategy for dialectic investigation of all subjects (Bai, 2008, Feng, 2004, Zhang, 1992). Yinyang is an all-encompassing yet flexible concept that can be adapted to any phenomena (Chen et al., 2010). Forke (1925) highlights that yin and yang mean nothing in themselves. It is only when they are utilised to express a particular relationship that they take on meaning. Hence, yin and yang only become meaningful within a specific temporal construct and when used to express a specific relationship (Wang, 2013).

Yinyang is the phenomena that exists only in the union of both yin and yang. Yin is dark and represents the feminine. It is subjective and intuitive. Yang is light and represents the masculine. It is objective and rational (Jenkins, 2002). Yin and yang are separate and discrete elements which occupy their own space and definable reality (e Cunha et al., 2002). However, when they operate in unison they create a third completely distinct force - yinyang. This union and the creation of a third force is referenced in chapter 42 of the Taoist sacred text (Tao te Ching), which states:

“...One gives birth to Two
Two give birth to Three...”

Tao te Ching chapter 42

In Western culture the theory of yinyang is often used to represent the concepts of harmony and balance (Wang, 2013) and is most recognisable through its graphic representation the Taijitu (Figure 5.1).

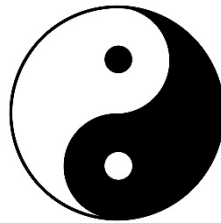


Figure 5-2: Taijitu (yinyang symbol)

However, to simply state that yinyang theory is about harmony and balance is to miss the complexities and subtleties of this philosophy (e Cunha et al., 2002). In doing so we miss the potential that it contains in helping to understand the current project management construct.

Yinyang depicts the duality that exists in all phenomena (Studies, 2009). Yinyang represents clarity, as there is no grey in yinyang (Studies, 2009). Each force is clear and defined, having its own strengths and weaknesses which are complemented by the other (Chen et al., 2010). However, at the core of each element is the ‘seed’ of its counterpoint (Symbols, 2014) highlighting the connectivity and interdependency that exists between the two elements.

Yinyang conveys the existence of five different relationships. These are *Opposition and Contradiction* [Maodun] through which the dynamic energy is created; *Interdependence* [Xiangyi] highlighting that one cannot exist without the other; *Interaction and Resonance* [Jiaogan] through which each element influences and shapes its counterpart; *Complementarity and Mutual Support* [Hubu] through which each element provides what the other lacks; and *Change and Transformation* [Zhuanhua] through which each becomes the other in an endless cycle of dynamic flow (Wang, 2013).

We intend to apply this philosophy to project management using a paradox theory and systemic discourses framework. Through this framework, we will demonstrate how the dualistic

elements of Satisfaction (Yin) and Success (Yang) coexist interdependently within the project management construct to create a third discrete phenomenon, which we term project management yinyang.

5.7.2 Paradox theory, systemic discourses and structural coupling

Competing demands are inherent within any organisation or system due to the limited availability of resources such as time, money and personnel. These competing demands create tensions (Smith and Tracey, 2016, North and Fiske, 2016, Kistruck et al., 2016). The existence of these tensions has become so prevalent in modern organisations that Ashcraft and Trethewey (2004) have stated that dealing with the tensions created by paradox is the “new normal” for managers. Often these tensions are not immediately recognisable. They can lie dormant or latent within a system until some specific action or environmental factor gives them salience (Luhmann, 2006, Smith and Tracey, 2016).

Paradox theory provides a framework for understanding these latent and salient tensions within systems and provides strategies for managing them (Smith and Lewis, 2011). Paradox theory highlights the importance of developing conceptual clarity to understand how tensions are created (Smith and Lewis, 2011). This clarity is developed by establishing boundaries between the paradoxical elements so the distinctions are recognisable (Smith and Tracey, 2016, Quinn and Cameron, 1988). Once the boundaries and distinctions are clear, an integrative model for managing the paradox can be developed (Luhmann, 2006, Seidl and Becker, 2006, Smith and Lewis, 2011).

Typically paradox theory research has focused on tensions that are created by contradictory elements that exist simultaneously within a system and persist over time (Lewis, 2000). However, Sutherland and Smith (2011) have proposed that this definition is broadened to include elements that are not necessarily oppositional, but rather are conceptually distinct and interdependent. As Janssens and Steyaert (1999) and Putnam et al. (2016) have noted, it is dualism, not contradiction that lies at the heart of paradox relationships. And these dualisms can be treated as interdependent and compatible rather than just conflicting and separate. For the

purpose of our paper we have adopted Sutherland and Smith's (2011) definition of paradox. We view success and satisfaction as two paradoxical phenomena within a project management construct. Phenomena which are conceptually distinct but still interdependent and compatible.

One of the benefits of drawing a distinction between paradoxical phenomena within a system is that it allows observers to understand how the systemic-discourse of each phenomenon differs from its counterpart (Seidl, 2006). Understanding the underlying systemic-discourse of different phenomena within a system is crucial, as many of the latent tensions within a system exist at the boundaries and intersections of these discourses (Luhmann, 2006).

In expounding the theory of systemic-discourse, Luhmann (2006) highlights how the paradoxical boundaries can be identified by examining the different functional systems at work within the meta-system. These different functional systems use different codes and logics to derive meaning and value. For example, Luhmann (2006) notes how a scientific system assesses the validity of information using a binary system of either true or false; whereas an economic system assesses an outcome as either satisfactory or dissatisfactory based on whether the value of the outcome exceeds the value of resources necessary to generate it.

Where a system only draws upon a single functional system it is internally consistent as it self-references its own internal logic and code. Therefore no tension can exist (Luhmann, 2006). However, when two or more functional systems coexist within a meta-system, tensions will be created as these systems attempt to communicate with one another using their own specific language-game (Luhmann, 1995, Wittgenstein, 2010, Lyotard, 1983). Language-games create tensions between systems because although these systems might appear to be communicating about a common issue, they are using fundamentally different codes and logics (language) to make sense of their world (Luhmann, 2006), and these different languages are "... ruled by different regimes, untranslatable into the other ..." (Lyotard: 1993, p. 200).

Because it is impossible for different functional systems to communicate directly with each other (Wittgenstein, 2010, Luhmann, 2006, Seidl and Becker, 2006) a process of deconceptualisation and reconceptualization occurs at the boundaries and interfaces of these

systems (Spee and Jarzabkowski, 2011). This process is often confused by actors within each of the different functional system as communication. However, it is, in fact, a form of structural coupling (Seidl, 2006) through which concepts from one functional system are broken down (deconceptualised) into packages of information that are recognizable within the second functional system. These packages of information are then consolidated within the new framework (reconceptualised) so value and meaning can be assigned to them.

Where a strong correlation between the deconceptualised and reconceptualised information occurs the system is said to be tightly-coupled. Conversely, where there a weak correlation between this information occurs the system is said to be loosely-coupled (Luhmann, 1995) As we shall demonstrate later in this paper, the project management construct has one of these internal boundaries between the functional systems of success and satisfaction. These two functional systems often operate in parallel and stimulate one another through structural coupling. However, they are in fact two distinct functional systems which utilize two very different language games.

5.7.3 Success (Yang)

More often than not project management practitioners consider their projects to be successful when they can demonstrate quantifiable performance against metrics that have been predetermined at the outset of the project (Thomson, 2011, Atkinson, 1999). Traditionally, project managers have used the constraints of the Iron Triangle such as time, cost, and quality as the key metrics by which the success of their project is evaluated (Atkinson, 1999, Winter and Szczepanek, 2008, Thomson, 2011). This reliance on predetermined performance metrics, the collection of quantifiable data to assess whether these metrics have been achieved, and the belief that success can be judged as an objective reality, belies the positivist epistemology of the traditional definition of success (Saunders et al., 2012, Edirisingha, 2012).

The language-game associated with this definition of success indicates that it falls into Luhmann's (1995) scientific system. In this system, success is judged on the basis of true/false responses to whether predetermined performance metrics have been achieved.

Proponents of the positivist school of thought, also referred to as the “Factors School” (Söderlund, 2011), have undertaken innumerable research activities to identify what criteria and factors, and what conditions and characteristics should be measured to help project managers achieve success. These studies have resulted in a plethora of new metrics beyond those of the traditional Iron Triangle, for project managers to assess in the hope of increasing the chances of success (Morris and Hough, 1987, Morris, 1994, Sayles and Chandler, 1992, Pinto and Mantel, 1990, Belassi and Tukel, 1996, Cleland and King, 1983, Locke, 1984). The underlying assumption of this body of work is that success is a phenomenon that can be measured by gathering enough empirical data to provide descriptive statistics that cannot be ‘logically’ refuted, and therefore must rationally ‘prove’ the success or failure of the project (Construction Industry Institute, 2011, Söderlund, 2011).

Despite new measurable criteria being available to project managers, the likelihood of achieving success under the positivist paradigm still remains elusive. The CHAOS report (Standish, 2009) estimated that even with new and expanded measurement criteria, 24% of the projects they investigated were failing and a further 44% were challenged. The report also noted that these results “...represent the highest failure rate in over a decade...” (Standish, 2009).

To the positivist, this disconnect between measurable metrics and success can be traced back to a failure in the criteria used to evaluate the project. As Stretton (2014) states, the continued failure of projects demonstrates “...an urgent and obvious need to develop comprehensive data on causes of project failures - preferably validated by appropriate and agreed criteria as to what constitutes success/failure...”.

Although the means to achieving success might appear relatively straightforward to those who view projects from the positivist perspective, other project management researchers have raised concerns as to whether the continual addition of objective performance criteria is the best developmental path for the profession. Atkinson (1999) states that the “...iron triangle rhetoric which has been followed over the last 50 years...may have resulted in a biased measurement of project management success. Creating an unrealistic view of the success rate...”.

Many researchers have noted the deficiencies that adopting a positivist epistemology can create within the context of project management. Specifically, this approach leads to a belief that universal standards for success can be developed (Nicholas, 2004, Dewulf and Van Meel, 2004). Others argue that the focus on these “...*explicit and measurable factors*...” (Dewulf and Van Meel, 2004) result in project managers placing more focus on achieving tangible “critical success factors” (Dietrich and Lehtonen, 2005, Cooke-Davies, 2004, Liu and Walker, 1998, Ribeiro et al., 2013) than on intangible project criteria, such as understanding the value perceptions which project participants have assigned to the project outcomes (Bryde and Robinson, 2005, Thomson, 2011).

The identification of these deficiencies has led to a new school of thought being explored by project management researchers. This new outlook challenges project managers to move beyond objectively assessable performance criteria that result in a scientific-based true/false language-game, and to start incorporating more intangible “human factors” into their assessment (Shenhar et al., 1997, Cooke-Davies, 2004). This move to intangible human factors requires project managers to view the management of their projects from new perspectives and functional systems.

5.7.4 Satisfaction (Yin)

One alternate epistemological perspective to positivism is that of interpretivism (Edirisingha, 2012). An interpretivist paradigm within a project management context postulates that the idea of success, as defined by positivistic criteria, is not as important as the satisfaction ‘felt’ by the project participants at the completion of the project (Lipovetsky et al., 1997). We believe this paradigm displays the language-game of Luhmann’s (1995) economic system. In this paradigm, project outcomes are assessed by how closely they align with the stakeholder’s expectations. Or put more simply, whether the stakeholders believe the project’s ‘pay-off’ was worth the effort.

Understanding the importance of satisfaction is relatively easy. However, defining and measuring satisfaction is infinitely more difficult (Lipovetsky et al., 1997, Kärnä, 2014). This is

because people assess the value of a project's outcomes subjectively (Shenhar et al., 1997, Kärnä, 2014, Barrett, 2000). These assessments are based on emotional responses derived from the intangible value that project participants have assigned to these outcomes (Sanvido et al., 1992, Parfitt and Sanvido, 1993).

Many researchers have noted that, as the discipline of project management develops, there is an increasing understanding of the importance that perceptions and expectations have on the participant's final evaluation of the project outcomes (Dalcher and Drevin, 2003, Turner, 2014). These perceptions and expectations form the basis of their final assessment of whether they 'feel' satisfied with the final project outcomes (Wuellner, 1990, Chan and Chan, 2004).

Horowitz (2005) explains that modern project managers operate in an environment where even positivistically 'successful' projects can be considered failures if they do not deliver what the stakeholders were expecting. Hoffman (2007) echoes these sentiments and states that while meeting deadlines and staying within budget may appear to be the most obvious challenges, managing the expectations of the project participants may be the greatest difficulty a project manager will face. Davis (2014) agrees, adding that in the 21st Century project managers will see more of a focus on satisfaction as a means of evaluating a project's final outcome.

This growing call amongst researchers for satisfaction to form a significant component in the determination of a project's ultimate value highlights the need for project managers to understand the undeniable link (i.e. structural coupling) between the interpretivist and the positivist epistemology within the project management construct.

As Yang and Peng (2008) have noted, the project participant's satisfaction with the project often includes a belief, perpetuated by the discipline of project management itself, that success should be objectively measured against time, cost and quality. This creates a coupled system through which the project's objective criteria (positivist assessment) can positively or negatively influence the project participant's level of satisfaction (subjective assessment).

The existence of this structural coupling highlights that project managers cannot truly separate project success from client satisfaction. These two phenomena cannot be isolated from each other and assessed independently. Although success and satisfaction are distinct systems, each utilizing its own language-game, they operate in parallel and are interdependent systems within the project management construct. So much so, that it could be argued that without success there cannot truly be satisfaction. And without satisfaction there cannot truly be success. Or as the philosophy of yinyang explains, the seed of each resides in the heart of the other. Therefore any framework which project managers adopt to manage success and satisfaction must embrace this paradoxical relationship.

5.7.5 Project Management Yinyang

Over the past two decades, project management researchers have begun to focus on how the two epistemological standpoints of success and satisfaction complement each other within the project management construct. Researchers such as Pinto and Mantel (1990), Turner and Zolin (2012), Parfitt and Sanvido (1993) and Cooke-Davies (2004) have proposed the concept of '*project management success*' as a completely separate phenomenon to that of either success or satisfaction.



We found the concept of *project management success* to be problematic for two reasons. Firstly, as defined earlier in this paper, the concept of 'success' carries with it a particular epistemological perspective and language-game. Hence, to use this word to define a paradoxical relationship which requires the existence of both the positivist and interpretivist paradigms could create a bias in the understanding of the phenomenon itself.

Secondly, we found the concept of *project management success* was poorly defined within the literature. Some authors discuss project management success as the acceptable completion of the technical aspects of the project as evidenced by the traditional positivist metrics (Atkinson, 1999, Stretton, 2014). Others describe it as a 'second-order' metric that includes a review of the project after it has been operational for a certain period of time (De Wit, 1988). Others use project success and project management success almost interchangeably to describe a wide

range of evaluation criteria including: measurement against strategic objectives (Cooke-Davies, 2004, Jugdev and Mathur, 2006, Killen et al., 2012); whether the final project outcomes work as expected (Karlsen et al., 2005); meeting project participant's expectations (Hoffman, 2007); and meeting the psychological expectations of the project participant. Synthesis is in relation to interpersonal relationships (Chan and Chan, 2004). Despite the inconsistencies that appear to exist within the project management literature about the concepts of success, satisfaction and the relationship that exists between them, it is clear that a differentiation between these three phenomena is justified (Shenhar et al., 1997, Cooke-Davies, 2004).

For the purpose of this paper we elected to conceptualize these three discrete phenomena through the philosophical construct of yinyang. Within this construct satisfaction (Yin) is considered to be derived from an interpretivist epistemology which values the invisible, the intangible, the implicit and utilizes an economic language-game. Complementing this, success (Yang) is considered to be derived from a positivist epistemology which values the visible, the tangible, the explicit and utilizes a scientific language-game. From this understanding, this paper considers project management yinyang to be an integrative state that requires the duality of both phenomena to be present and influence each other. This duality is conceptualised in Table 5-3.

Table 5-3: Project Management Yinyang

Relationship	Project Management Yinyang	
Phenomenon	Satisfaction	Success
Epistemology	Interpretivist	Positivist
Perspective	Subjective	Objective
Assessment criteria	Perceived value	Predetermined quantifiable metrics
Functional System	Economic	Scientific
Represented by	Yin 	Yang 

5.8 Research question

This paper has already identified the need to create a distinction between the concepts of success (Yang), satisfaction (Yin) and project management yinyang. The literature reviewed in this paper demonstrates that there is a need for an integrative framework to help researchers and practitioners understand the paradoxical relationship that exists between these concepts as experienced and practised in the project environment. From this foundation, a valid research question appears to be:

RQ: Could the philosophy of yinyang help project managers better understand the relationship that exists between success and satisfaction within the project management construct?

5.9 Research methodology

5.9.1 Grounded Theory Overview

This research utilizes a Grounded Theory (GT) methodology. GT is a qualitative research method which attempts to develop novel frameworks by investigating social processes from the perspective of those who live them (Bryant and Charmaz, 2007, Locke, 2003). It is undertaken within a specific context and develops through a simultaneous and non-sequential process of data collection and analysis (Glaser and Strauss, 1967, Locke, 2003, Milliken, 2010). GT research is an iterative process which cannot be formally planned in advance as it must remain flexible enough to react responsively to emergent themes (Wastell, 2001). As the aim of our research is to conceptualize and develop abstract meaning from socially contextualized actions (Locke, 2003), GT was considered the most appropriate research method.

Glaser and Strauss (1967) argue that any GT research project should commence with the identification of a particular social phenomenon or process. This phenomenon or process should be investigated through the simultaneous collection and analysis of data to allow categories to emerge naturally (Milliken, 2010). Only once these categories have become evident from the

field data should the researcher attempt to group these into key themes and properties, and attempt to articulate the relationships that exist between them (Milliken, 2010, Locke, 2003). The final stage in a GT method is a review of the background and contiguous literature to understand how the identified themes, properties and relationships interact with the current body of knowledge (Flipp, 2014).

5.9.2 Overview of GT application to this research

We have applied the GT method to our research using a two-phase approach. We commenced with an identification process (Phase 1) which codified a particular social phenomenon within the project management construct. With this phenomena identified we purposively selected case studies which appeared to exhibit a clear demarcation between success and satisfaction. These case studies were analysed to help provide us with guidance on key categories for a more detailed investigation. The Phase 1 analysis identified three broad categories from within the data which provided parameters for our Phase 2 investigations.

The categories identified in Phase 1 were used to guide semi-structured interviews during the investigation process (Phase 2). The data collected through these interviews resulted in an additional four categories being identified. The seven categories were then subjected to a three-stage analysis, which resulted in these categories being classified as two themes and their associated properties. A flowchart of our methodology is included in Figure 5-3.

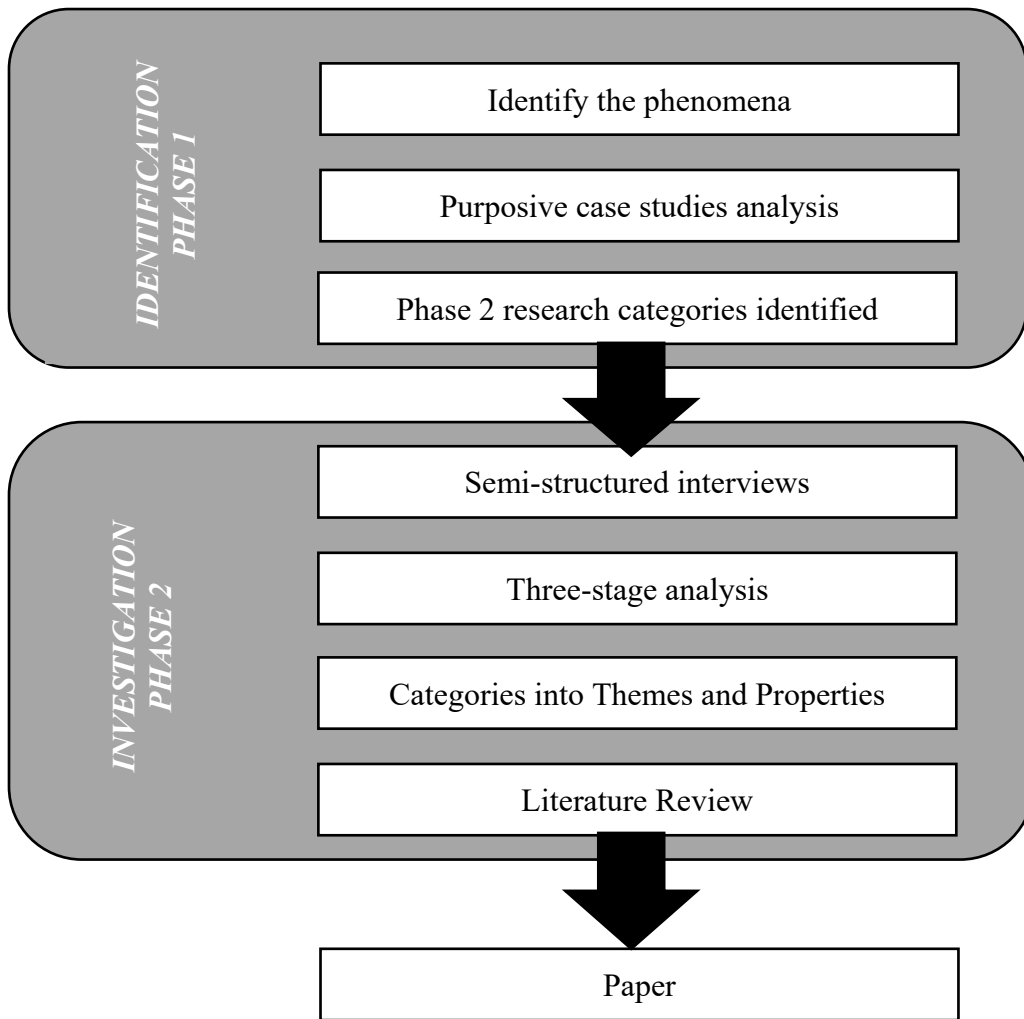


Figure 5-3: Overview of the Project Management yinyang GT methodology

5.9.3 Detailed research methodology

Our research took place over a six-month period and was conducted in two phases. Phase 1 commenced with the codification of a phenomenon observed by one of the authors who is a consulting project manager working in the Australian Construction industry. The phenomenon was that the completion of a seemingly successful project did not always result in the project participant's feeling satisfied with the project outcomes. Based on this observation, we postulated that the phenomenon was the result of project participants using different assessment perspectives in their evaluation of the project outcomes.

To help us identify the elements for more detailed research, we purposively selected two recently completed projects as case studies. These case studies were specifically selected because they appeared to contain a clear demarcation between concepts of project success and client satisfaction. Using a targeted selection process like ours is not unusual in a GT methodology where the case studies can become an object of study in themselves (Patton, 1990). Because we have purposively selected these cases, we consider them to fall into the “instrumental” classification noted by Stake (1994, 1995). We made a conscious decision to select two projects delivered by the same project manager as the subjects for the case studies. The rationale for this decision was to reduce variables that may have existed in the application of project management methodologies and the personal characteristics of the project manager.

The analysis of these case studies commenced with inductive category construction (Kuckartz, 2014). This was achieved by paraphrasing and abstracting the salient points within the cases. Once identified, these were subjected to a comparative thematic analysis (Tuckett, 2005) and consolidated into three generalized categories. These three categories became the key areas for our Phase 2 investigations. The categories identified through the case study analysis are noted in Table 5-4.

Table 5-4: Categories identified through the case study analysis

Case Study	Category
1	Duality
	Focus
2	Duality
	Multiple Expectations

Phase 2 of the research was conducted using semi-structured interviews from a theoretical sample of ten practising consultant project managers. The interview participants were all male with between five and ten years’ experience as project management practitioners. At the time of conducting our interviews, all of the participants were managing multiple projects within the Australian Construction sector. Their clients included eight government departments or agencies (Federal and State), four institutions (education and health), and six private organisations (data centres, retail, residential and industrial). The interviews were digitally recorded and transcribed

into Nvivo for data analysis. The recordings, transcripts and associated data analysis are retained on a password-protected computer. To protect their privacy, interviewees were assigned a re-identifiable code (PM01-PM10) during the transcription process.

The analysis of the interview data was conducted using a three-stage approach (Algeo, 2012). The first stage involved a process of open coding to identify emergent concepts from within the data (Flipp, 2014, Glaser, 2007, Bryant and Charmaz, 2007). As a result of this open coding process, four additional categories were added to those identified through the case study analysis. This brought the total number of identified categories to seven. These categories are noted in Table 5-5.

Table 5-5 Project management yinyang: Categories and data collection method

Category	Data collection method
Duality	CS1, CS2, Interviews
Focus	CS1, CS2, Interviews
Multiple expectations	CS1, CS2, Interviews
Success	Interviews
Satisfaction	Interviews
Multiple pathways	Interviews
Funnelling	Interviews

The second stage of the analysis involved a process of axial coding. Through this process we classified the categories into themes and properties so that we could identify the basic elements of a theory to explain the phenomenon under investigation (Flipp, 2014). Through this process the categories were consolidated into two themes and five associated properties. These themes and properties are identified in Table 5-6.

Table 5-6: Project management yinyang: Themes and Properties

Theme	Properties
Duality	Success
	Satisfaction
Focus	Multiple Pathways
	Multiple expectations
	Funnelling

The final phase of analysis involved selective coding (Dey, 2007). This process involved a review of the key themes and their properties to understand how they interrelated (Flipp, 2014, Wastell, 2001). Following this final analysis a review of the background and contiguous literature was undertaken to understand how the themes, properties and relationship interacted with the current body of literature (Milliken, 2010).

5.10 Data Collection and Analysis

5.10.1 Case study 1 [CS1]

This project was delivered for the Australian Department of Defence. The stated outcome of this project was the development of training area facilities to support new capabilities for seven discrete user groups. At the project's commencement the project manager confirmed the project budget (\$8 Million) and the required timeframe for delivery (18 months for design and construction) with the project sponsor's representative.

The project manager engaged directly with the user groups to determine their expectations in relation to the functional requirements of the facilities through an initial user requirements briefing and four separate design review workshops throughout the design development process. In the final month of the design process the project sponsor's representative was deployed to another position and a new project sponsor's representative was appointed.

After the completion of design, but prior to the commencement of construction, the new sponsor's representative advised all parties that the project budget had to be reduced to \$5.4 Million. Based

on this new information the project manager undertook a scope reduction workshop with the project Sponsor and user group representatives, the design team, and the Construction Contractor. The outcome of this workshop was a reduced project scope and an endorsed, prioritized, and costed list of scope items to be reintroduced into the project as risks were retired and contingency funds were released. The Contractor agreed to the reduced scope and the construction contracts were duly executed.

The physical construction of the facilities took 9 months. Throughout this process, the project manager met with the project sponsor's and user group's representatives at least once a month to discuss the progress of the project. All variations were reviewed and approved by the sponsor's representative prior to being executed by the project manager. During construction, the project manager worked collaboratively with the Contractor and the representatives of the sponsor and user group to implement the risk mitigation strategies necessary to reduce the contingency allocations. As the Works progressed and risk contingencies were retired, and the project manager was able to reintroduce three previously removed scope items from the endorsed scope list.

Two weeks prior to Practical Completion the original sponsor's representative was reintroduced to oversee the final delivery of the project. During his absence from the project the original sponsor's representative had no visibility of the project nor was he involved in any of the communication regarding scope reduction, risk mitigation strategies, and reintroduction of deliverables.

The project was completed 0.15% under the revised project budget. The Contractor was awarded Practical Completion two days prior to the revised date for Practical Completion. All identified defects were rectified and closed out within four months of reaching Practical Completion.

Three months after Practical Completion was achieved, the project manager facilitated a Post Occupancy Evaluation and Lessons Learnt workshop. This workshop was attended by the sponsor's and user group's representatives, design consultants, the Contractor and the project manager. At this meeting the sponsor's and user group's representatives commended the project manager and Contractor for completing the project on time and under budget and advised they

felt the project was successful and were generally satisfied with the project outcomes. However, the returned sponsor's representative expressed displeasure regarding the functionality and operability of the project deliverables due to the removal of scope items as a result of the reduced budget.

5.10.2 Analysis of Case Study 1

The open coding analysis of Case Study 1 [CS1] identified the following categories relevant to this research:

5.10.2.1. *Duality*

CS1 indicates the concurrent existence of both the positivist concept of success and the interpretivist concept of satisfaction within this project. The case study shows that metrics for success (positivist epistemology) were agreed at the commencement of the project (cost, time and functional requirements). These provided prescribed measurement criteria for determining the project success. The project participant's perceptions (interpretivist epistemology) regarding the project outcomes were captured during the user requirements briefing and subsequently confirmed during the design review workshops thereby providing a framework for understanding their expectations regarding the project outcomes.

The feedback received from the project participants at the Post Occupancy Evaluation and Lessons Learnt workshop regarding the 'success' of the project references the performance metrics as the evaluation criteria used. However, the objective 'success' of the project did not result in satisfaction with the project outcomes on behalf of the returned project sponsor's representative. This appears to indicate a duality within this project between the successful delivery of the project outcomes and this particular stakeholder's expectations of what the project was attempting to deliver. This duality indicates the existence of a paradoxical relationship.

5.10.2.2 Focus

The re-scoping workshop undertaken as a result of the reduction in project budget indicates that both the performance metrics (positivist assessment) and project participant's expectations (interpretivist assessment) changed throughout the project to address unforeseen challenges. The reduction in project budget and the subsequent scope contraction demonstrated in CS1 indicates that success cannot always be judged by reference to the originally agreed performance metrics.

CS1 appears to indicate that both the positivist-based success criteria and the stakeholder's expectations regarding the future project outcomes are flexible. CS1 demonstrates that external influences can impact on both objective and subjective assessment perspectives. These influences appear to create opportunities for project participants who may view the project from either the positivist or interpretivist paradigm, to reassess their understanding of the emerging reality, and develop a clearer more focused understanding of what the final project outcomes will actually be and what they can expect from them.

5.10.3 Case study 2 [CS2]

This project was undertaken for a not-for-profit service provider in Australia. The stated objective of this project was to prepare a business case for the development of a mixed-use, intergenerational, community-living precinct. The project manager was engaged to undertake scope definition through semi-structured interviews and group workshops, to procure the technical disciplines required to develop a master-plan, and to draft a business case for endorsement by the sponsor's governing body.

At the commencement of the project the project manager confirmed the project budget (\$ 0.35 Million) and the required timeframe for delivery (6 months for business case development and submission) with the project sponsor's representative.

To gain approval through the Organization's governance structure the project manager was required to obtain endorsement from five levels of governance with representatives from ten different departments. Many of the governance representatives had never been involved in a Construction project before, other than Residential Construction. The representatives of these groups had wide-ranging expectations regarding the final outcomes of the project that affected the development of the business case. These expectations included differing opinions regarding what facilities should be included for assessment, the allocation of capital and operational costs in relation to those facilities, differences in project priorities, and disagreements regarding funding models.

The project manager engaged with each of the user and governance groups individually to gather and document their expectations in relation to the project outcomes. This information was consolidated into a user requirement matrix and provided to all user group and governance groups representatives. The project manager then facilitated a meeting with all the representatives and gained consensus from the combined group on each of the project requirements and how important each element was to the overall Organization. This process resulted in a fully-documented user requirements brief that outlined and prioritised all the stakeholder's expectations regarding the final project outcomes.

From the information in the user requirements brief, four master-planned options were developed and endorsed by the governance structure for inclusion in the final business case. Multiple funding options were explored for each master-planned option, and the associated financial hurdle rates were assessed. At the submission of the project deliverable, the project had run 18 weeks over the original forecast (75% over time) and had cost \$0.49 M (40% over budget).

At the presentation of the business case the Organization's representatives unanimously commended the project manager for successfully developing the business case, managing the complex stakeholder and governance environment, and mentoring the governance team. The stakeholders noted that they were extremely happy with the outcomes of the business case. As a result of their experience with this project, the not-for-profit Organization requested two more business case submissions for different development sites from the project manager and engaged

the project manager to oversee the Development Application process for the first stage of construction.

5.10.4 Analysis of Case Study 2

The open coding analysis of Case Study 2 [CS2] identified the following categories relevant to this research:

5.10.4.1 Duality

CS2 also indicates the concurrent existence of both the positivist concept of success and the interpretivist concept of satisfaction within this project. The project (business case) was required to achieve predetermined performance metrics in both time and cost, and the project participant's had clear, although varied, expectations on what was to be delivered.

Based on the predetermined performance criteria this project was not a success. It was delivered well over budget and outside the originally agreed timeframe. Interestingly, this did not appear to affect the sense of satisfaction that the project participants' felt at the completion of the project as evidenced by their expressions of satisfaction and through the subsequent engagement of the project manager on additional projects. This indicates the existence of a paradoxical relationship, where the systems of success and satisfaction are loosely coupled.

5.10.4.2 Multiple expectations of project outcomes

CS2 indicates that the participant's expectation of the project's goals is not always unified. The project manager recognised this early in the project and utilised a process of detailed stakeholder engagement and consensus-building to consolidate the various expectations. This process allowed the project manager to focus the project participants' perception of what the project would deliver and create a framework for managing expectations.

5.10.5 Phase 2: Interviews

Following the analysis of the case studies, semi-structured interviews were conducted with ten project management practitioners. The aim of these interviews was to help us gain a better understanding of the categories identified through the case study analysis.

5.10.5.1 Duality

The interviewees were asked whether they had ever completed a project that they thought was successful, but other project participants were not satisfied with the project's final outcome. Seven of the interviews confirmed that they had experienced this phenomenon. This appears to confirm the existence of a positivist/interpretivist duality, which can result in a loosely-coupled paradox within the project management construct.

5.10.5.2 Success

When asked why they felt the project was successful, 70% of the responses referenced some form of positivistic performance metrics as the basis for their assessment.

“...it’s simply about time, cost and quality; and if you’ve come in on time, under budget and as per the approved plans ... then absolutely the project is a success...” (PM06)

However, PM06 made another interesting comment during his response.

“...If you’ve achieved those KPIs and the client is not satisfied, well then there’s a disconnect somewhere between something in the project....I don’t think the client being unsatisfied automatically makes a project unsuccessful...” (PM06).

This comment highlights the duality of success and satisfaction within the project management construct. PM06 refers to positivistic measurements (KPIs) but also notes that these do not guarantee satisfaction. The use of the word ‘*disconnect*’ indicates the existence of a loose structural coupling within the project management construct. This comment appears to support our premise that a disconnect (imbalance) between the two elements is possible, and that this imbalance can disturb the project’s yinyang.

5.10.5.3 Satisfaction

The interviewees were asked why they felt some participants were dissatisfied with project outcomes that achieved the stated performance criteria.

“...it’s a subjective assessment, I sometimes think they aren’t sure why they are not happy...It’s just that they expected something but didn’t get it...” (PM02)

“...they don’t know the actual result they will get. They only know what they feel about what the actual result is going to be...and what that can bring to them is an emotional pride, celebration, achievement.... So if you’ve got the emotional thing wrong at the end, then you know that, actually, there was something along the line that they disagreed with ...whether it’s time, cost, quality, or risk, or whatever it might be...all you’re doing along the way is really just building confidence, and happiness, and awareness, and knowledge...so when they get to the end they say "Wow, look at this... it's amazing". (PM10)

We found the comments by PM10 particularly interesting. PM10 links the positivistic assessment criteria (Yang) of “...*time, cost, quality, or risk*...” to the interpretivistic evaluation criteria (Yin) of “...*confidence, and happiness*...” which, once again, indicates a structural coupling between these systems. This would appear to support the premise that the ‘seed’ of each system is contained within the other, and would therefore support the existence of the philosophy of yinyang within the project management construct.

5.10.6 Focus

5.10.6.1 Multiple pathways

The interviewees were asked whether they felt that, at the commencement of the project, there was only one possible outcome available to meet the performance metrics established. All of the interviewees believed that there was more than one possible way to achieve the project outcomes in accordance with the established performance metrics. PM02 noted that the emergent nature of projects dictated that multiple pathways need to be considered in reaching the final project outcome.

“...things change....you’ve got to build in flexibility so that, over the project, you’ve got an opportunity to shuffle around or adjust stuff...”. (PM02)

The concept of an emergent pathway is closely aligned with yinyang relationships of *Jiaogan* (Interaction and Resonance) and *Zhuanhua* (Change and Transformation). The emergent nature of the project management construct creates a need for the functional systems of both success and satisfaction to remain fluid so that they can interact, resonate, change and adapt to the influences which impact on the project.

5.10.6.2 Multiple expectations

In reference to the concept of satisfaction, the research participants were asked whether their clients consisted of a single entity or multiple stakeholders. When all the interviewees advised that their clients consisted of multiple stakeholders, they were asked whether they felt the stakeholders had a common perception of the project’s final outcomes.

“...Oh God no! absolutely not...if there is any commonality it will be based on any technical briefings that have been given, so they would all expect that they will get a restaurant...but in their heads I guarantee that everyone sees a different picture of that restaurant...”. (PM05)

“...No, they all have quite different understandings and it’s all dependent on their own experiences, and backgrounds and what their key areas [in the Organization] are...” (PM04)

We found these responses interesting as they indicated the existence of the Maodun (Opposition and Contradiction). Paradoxically, however, they concurrently indicated the existence Hubu (Complementarity and Mutual Support) in that multiple disparate expectations could be brought together or focussed on a single final outcome that all parties could be satisfied with.

5.10.6.3 Funnelling

The interviewees were then asked how they transitioned from multiple possible outcomes based on performance metrics and multiple expectations to a single final project outcome. Many of the interviewees describe a process of ‘Funnelling’.

“...you’ve got to narrow your focus...you’ve got to define the funnel to make sure the project ends up a point inside that funnel that matches what they [project participants] are thinking they are getting...that’s the real job [as a project manager] ...” (PM08)

When describing their role as project managers both PM05 and PM10 made a funnel motion with their hands.

“...you keep narrowing down the options until you all know what you are trying to deliver...” (PM05)

“...you’ve got to guide and lead them [project participants] to where you are headed...”. (PM10)

This concept of Funnelling appeared to be a function of the Hubu (Complementarity and Mutual Support) which we noticed while discussing both the multiple pathways (success criteria) and the multiple expectations (satisfaction criteria). In addition, this concept of funnelling appears to be one of the processes that the interviewees used when trying to address the Zhuanhua (Change and Transformation) evidenced in the comments regarding the multiple pathways, and the Maodun (Opposition and Contradiction) evidenced in the comments regarding multiple expectations.

5.11 Discussion

5.11.1 Theme 1: Duality

Our data indicates project participants assess projects from different paradoxical perspectives. The existence of this duality guided us to conceptualise the delivery of a project differently to the traditional linear approach. Rather than adopting an approach where the project has a single start point we conceptualized a framework in which the project's final outcome is being approached from two separate starting points. The first starting position is a positivist epistemology, the other is an interpretivist epistemology. From these two starting positions, both the positivistic and the interpretivistic assessment of the project moves concurrently towards the project's final outcome.

The paradoxical relationship that exists at the boundary of the positivist paradigm, which is based on rationality and objectivity, and the interpretivist paradigm based intuition and subjectivity lead us to the concept of yinyang within the project management construct. A paradoxical framework which conceptualises success (Yang) and satisfaction (Yin) within the project management construct is provided in Figure 5-4.

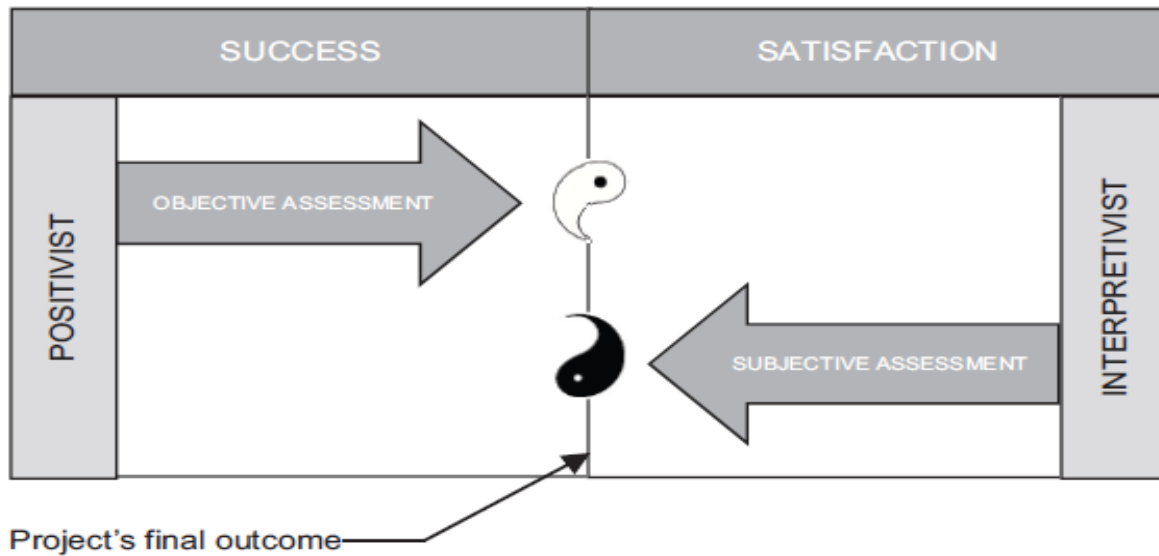


Figure 5-4: Yinyang framework

Our paradoxical, yinyang framework helps us understand why some projects can be considered a success by some project participants while other project participants are not satisfied. As represented through our framework, success (Yang) is a separate element to that of satisfaction (Yin). They are the result of two different paradigms (positivist and interpretivist) and utilize two different language-games. In our framework, the two occupy their own space and definable reality, but they are disconnected, uncoupled, and not balanced by their complementary element. Viewing our framework through chapter 42 of the Tao Te Ching, we could say that the framework shows that One (project) has given birth to Two (success and satisfaction), but the Two have not given birth to Three (yinyang). Hence, the relationships required for yinyang do not exist and there is imbalance and disharmony between the assessment paradigms. Furthermore, our framework highlights that the seed of success (Yang) lies at the centre of satisfaction (Yin), and the seed of satisfaction (Yin) lies within success (Yang).

5.11.2 Theme 2: Focus

We then applied the theme of Focus to our yinyang framework. Our data indicated that there is no set path to reach the project's final outcomes when approaching it from a positivist epistemology. The interviewees noted the existence of multiple potential pathways for

achieving a project's final outcomes, even when specific performance criteria (i.e. time, cost and scope) have been set.

Furthermore, the data indicates the same is true of project participant's expectations when approaching the project's final outcomes from an interpretivist epistemology. The existence of these multiple pathways and multiple expectations is conceptualized within our yinyang framework in Figure 5-5.

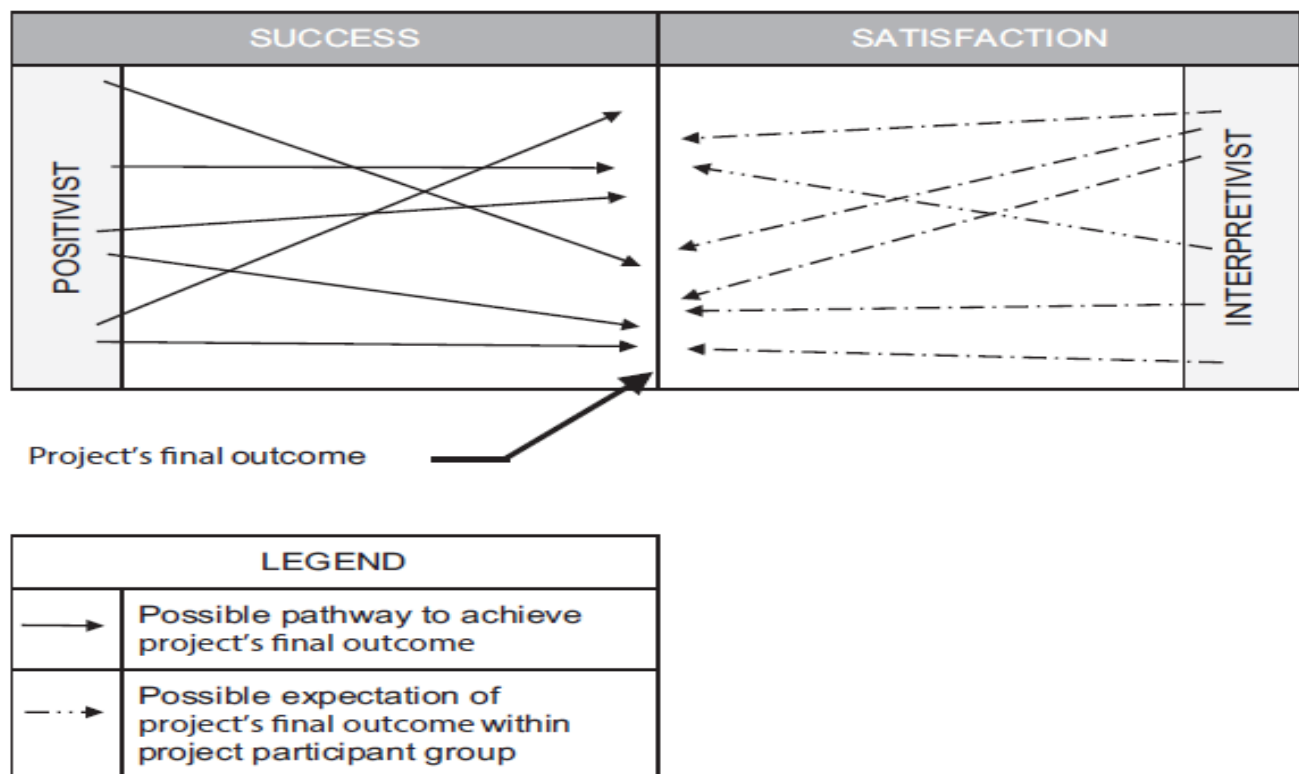


Figure 5-5: Multiple pathways and expectations within the yinyang framework

Our data indicated the existence of multiple pathways and expectations at the commencement of the project. To manage this, the interviewees described a process of Funnelling. Through Funnelling the project manager focuses these multiple pathways towards a single, consolidated outcome. As a complementary force to this (Hubu) the project manager also aligns the multiple expectations to create a group understanding of the project's outcome. The theme of focus and the process of Funnelling lead us, once again to the concept of yinyang. Specifically, with reference to the clarity represented in the Taijitu where the project's outcomes and the client's

expectations must be clarified, through focus, to allow progress towards a common goal. The concepts of Focus and Funnelling are applied to our yinyang framework in Figure 5-6.

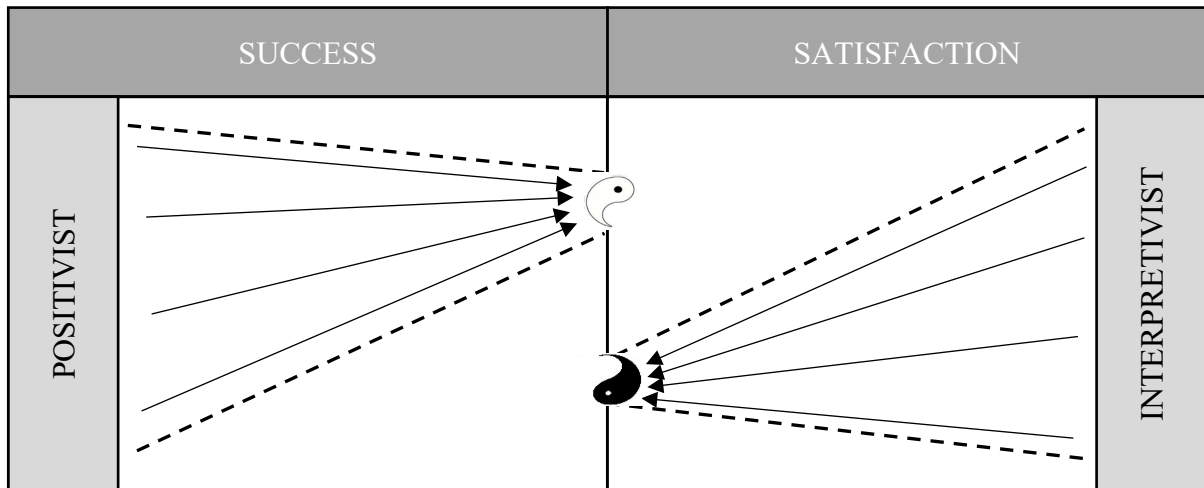


Figure 5-6: Funnelling in the yinyang framework

As our framework represents, success (Yang) cannot be achieved unless the project manager can focus the direction of the project towards a defined outcome. Complementing this, unless the project manager can focus the project participant's expectations towards a specific outcome, the range of subjective assessments will be too broad to ensure a generalized satisfaction (Yin) with the project's outcomes.

5.11.3 Convergence and project management yinyang

Our framework has already explained how a project's final outcome is approached from alternate paradigms; how these can create a paradoxical relationship; and how this relationship has the potential to result in disharmony and imbalance between the rational and objective assessment of the project Yang and the intuitive and subjective evaluation of the project Yin if these are not tightly coupled. We now discuss how the Two (success and satisfaction) give birth to the Three (Yinyang) within the project management construct.

Although we recognise that project management yinyang may occur serendipitously, we believe the existence of multiple paths and expectations makes this improbable. Therefore, achieving project management yinyang will most likely occur through the direct actions of the project manager. In order to achieve project management yinyang, the project manager must first recognise the existence of the paradoxical paradigms which are at work in the project management construct. Then they must understand that the language-games of these paradigms can result in different assessments of the project's final outcomes and can result in salient tensions within the project management construct.

Next, the project manager must understand that achieving focus, through the process of funnelling, is not enough to create project management yinyang. Focus is required to achieve both success (yang) and satisfaction (yin), but on its own it is not enough to create yinyang. Project management yinyang is achieved through both *focus* and *convergence*. That is the project manager must focus the multiple pathways towards a single outcome to achieve success (Yang). And they must focus the multiple expectations towards a single outcome if they are going achieve satisfaction (Yin). However, unless the project manager has aligned these two forces so they converge there cannot be Xiangyi [Interdependence], Jiaogan [Interaction and Resonance] or Hubu [Complementarity and Mutual Support] (Wang, 2013). If all of these relationships are not present then project management yinyang does not exist. Therefore the project manager must create focus and convergence to achieve project management yinyang. This convergence is a form of tight structural coupling between the paradoxical paradigms and is represented in our yinyang framework in Figure 5-7.

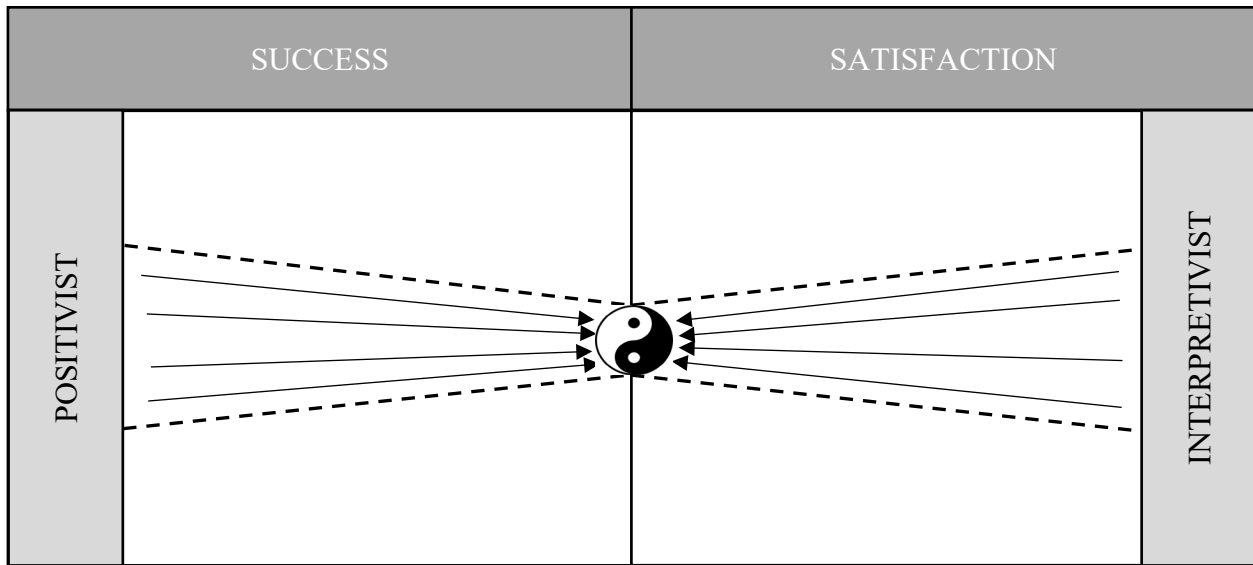


Figure 5-7: Yinyang framework: Convergence

In order to achieve project management yinyang, the project manager must embrace a holistic philosophy. They must understand the alternate and complementary nature of the positivist and interpretivist paradigms within the project management construct. They must understand how success (Yang) and satisfaction (Yin) are created through focus, and they must understand that yinyang is a born from the convergence of these elements.

5.12 Limitations and Challenges

5.12.1 Sample Limitations

Our research was conducted using a small sample of both case studies and interviewees. The sample size restricts the generalizability of our results. In addition, all our interviewees were male. This introduces the potential for gender bias in our results and may have skewed the data towards Yang (masculine) biased findings. These limitations could be overcome in future research by selecting a larger, more diverse sample of case studies and interview participants.

5.12.2 Data Collection Limitations

Our case studies were purposively selected because they appeared to include a duality within the social processes under investigation. While this is acceptable within a GT methodology we accept that a purposive selection of case studies has the potential to produce bias results.

The data collection limitations could be addressed in future research by applying the findings of this research to different projects, and by randomly selecting case studies to investigate if our findings are recognisable through these.

5.12.3 Generalisability

Both our research methodology (GT) and our research subject (yinyang) exist within specific contexts. For this reason, the ability to generalize our findings outside the context documented in our research is limited. Future research could consider applying our findings to different contexts to determine if these can be expanded and generalized.

5.13 Implications for research and practice

5.13.1 For researchers

Our research conceptualises project management differently to the traditional, linear representation. By creating a dualistic and complementary framework with alternate starting positions, and by conceptualizing the project's final outcomes at the centre of the project rather than the end, we have been able to provide a new perspective for understanding the project management construct. Further research into novel frameworks may offer new and deeper understandings of the relationship that exists between the elements of success, satisfaction, and project management yinyang.

The Taoist philosophy of yinyang is briefly dealt with in our research however, the complexities and intricacies of this philosophy may have more insights to offer the profession of project management. Researchers may wish to delve more deeply into the Taoist philosophy in a quest to uncover new understandings not identified in our limited review.

Finally, future research projects could expand our findings through larger and more diverse samples, or through applying our findings to different contexts.

5.13.2 For practitioners

Traditionally project managers have approached their projects from a positivistic paradigm, focussing their efforts on the predetermined metrics of success (Yang). In recent years, this focus has begun to include the subjective element of satisfaction (Yin). However, our research indicates that understanding the existence of the yin and yang of project management is not enough.

Our research indicates that project management practitioners would benefit from adopting a holistic view of their projects, and understanding the importance of both focus (which creates both yin and yang), and convergence (which creates yinyang). This Tao-based perspective may also help practitioners understand that they are not managing two forces (success and satisfaction) within the project management construct, but three (success, satisfaction and yinyang).

5.14 Conclusion

Our research has developed a dualistic, yinyang framework to help understand how both success and satisfaction exist within a project management construct. Using a Grounded Theory methodology, we were able to identify key themes and properties from our field data. This emergent research methodology led us to consider a Taoist construct for understanding success and satisfaction, and a third phenomenon which we have termed project management yinyang.

Project management yinyang requires project management practitioners to adopt a paradoxical and holistic perspective of their projects, in which positivist and interpretivist paradigms approach the project's final outcomes from alternate and complementary starting points. Our framework provides context for understanding that focus is required to achieve both success (Yang) and satisfaction (Yin), but convergence is required to achieve project management yinyang.

6 The Final State Convergence Model.

6.1 Structure Map

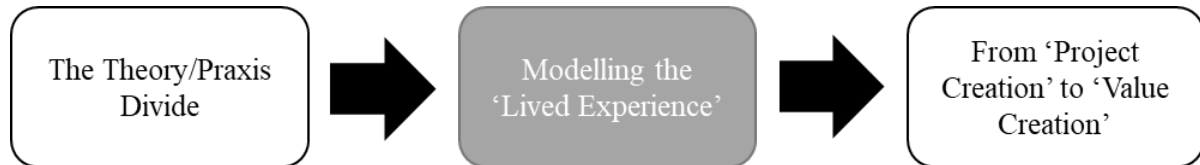


Figure 6-1: Thesis structure map (Chapter 6)

6.2 Preface

This chapter provides the full, accepted manuscript from an empirical, peer-reviewed paper developed as a result of this doctoral research. This paper, titled “The Final State Convergence Model”, was published in the *International Journal of Managing Projects in Business*. In this paper I was attempting to synthesize my new understandings of the ‘lived experience’. In particular, I was deliberately moving away from a deterministic model of project management which was dictated by Transformational Production Management theory. I wanted to develop a model that represented the non-linearity, non-sequentiality and multiple pathways to project completion that I had experienced in my role as a client-side project manager. In addition, this model also synthesized my findings from Chapter 3 regarding Strategic Management and Complexity theories as well as further developing the concepts outlined in Chapter 5 regarding the different functional systems which perceived the project from different starting points, before eventually converging at the project’s Final State.

6.3 Key points of this chapter relevant to this thesis

Table 6-1: Key themes of Chapter 6 relevant to this thesis.

- Modelling the ‘lived experience’ of client-side project managers.
- Conceptualizing non-linearity, multiple pathways, focus, convergence, systemic discourses (project success/client satisfaction) within a new model of client-side project management.
- Augmentation of Traditional Project Management theory with Strategic Management and Complexity theories.
- Introducing ‘value creation’ into the discussion of the ‘lived experience’ of client-side project managers.

6.4 Citation and Co-author details

Table 6-2: Citation details of original publication

Citation details	Usher, G. & Whitty, S. J. (2017). "The final state convergence model". <i>International Journal of Managing Projects in Business</i> , Vol. 10 No.4, pp 770-795.
# of times cited	1
Writing	Greg Usher (90%); Dr S.Jon Whitty (10%)
Data collection and analysis	Greg Usher (100%)
Quality Review	Greg Usher (80%); Dr S.Jon Whitty (20%)

Citation details from Google Scholar, as at 31 July 2018.

6.5 Abstract

Purpose:

The goal of this research is to expand project management *theory about practice* and *theory for practice* through a new conceptual model developed from the transformational production management, strategic management and complexity bodies of theory.

Design/Methodology:

This research uses a grounded theory methodology. A preliminary model is developed and tested against two case studies. The model is revised and tested using a purposively selected focus group before being presented in this paper.

Findings:

Our research indicates that the ‘Final State Convergence Model’ which has been synthesized from the transformational production management, strategic management, and complexity theories. Our model illuminates the complexities that can exist within the practice of project management.

Research Implications:

The Final State Convergence Model provides a novel approach to synthesizing new bodies of theory into traditional project management theory

Practical Implications:

Our model challenges practitioners to think beyond their current conceptual base of traditional project management methodologies, systems, and processes towards a broader conceptualization of project management.

Originality/Value:

Our research adds to the *theory about practice* and *theory for practice* through the development of a new model which not only illuminates the complexities of project management but enriches and extends our understanding of the actual reality of projects and project management practices.

6.6 Introduction

Project management is a profession that is outgrowing its traditional theoretical foundations (Koskela and Howell, 2008, Winter et al., 2006). Many modern-day project managers are attempting to deal with the challenges of Mega, Wicked and Complex projects (Oehmen et al., 2015, Giezen, 2012, McCall and Burge, 2016) using methods, systems and processes based on theoretical foundations that are over one hundred years old and specifically developed to assist factory managers set out production machinery and increase operational efficiency (Taylor, 1911, Usher, 2014b).

These challenges have been noticed by project management researchers and practitioners alike as they become increasingly aware of a widening divide developing between project management theory and practice (McKenna and Whitty, 2012, Morris, 2007, Cooke-Davies et al., 2007). In 2006 the Rethinking Project Management Network (the ‘Network’) proposed an agenda for the future of project management research (Winter et al., 2006). One of the main findings of this research was:

“...that the extant project management body of thought is [not] worthless and should [not] be abandoned, but rather that a new research network was required to enrich and extend the field beyond its current intellectual foundations...” (p.639).

In an attempt to address this theory-praxis divide project management researchers have begun exploring alternate bodies of theory which might augment the classical theoretical foundations of project management and assist in understanding how projects could be better managed in the modern-era (Walker, 2015, Klein et al., 2015). Our research builds on this previous research by exploring three bodies of theory that have been previously been proposed as alternate bodies of theory for developing the discipline of project management. Our goal is to expand project management *theory about practice* and *theory for practice* through a new conceptual model.

Similar to the Network’s research we began by reviewing transformational production management, which has been proposed as the traditional theoretical foundation of project management (Koskela and Howell, 2008). From there we reviewed two, more recently proposed alternatives; strategic management (Patanakul and Shenhar, 2012, Dvir and Lechler, 2004) and complexity theory (Padalkar and Gopinath, 2016, Cooke-Davies et al., 2007). Our

aim was to determine what can be learned from these bodies of theory that might enrich and extend the field of project management research.

The intention of our paper is not to provide specific support for any one of these particular bodies of theory in relation to project management, instead our paper focusses on addressing one obvious deficiency in relation to all three bodies of theory within the project management construct. The deficiency that, although each of these bodies of theory has previously been investigated as theories to augment project management, all three have been addressed as discrete fields of research. Our investigations indicate that no model has been developed to assist researchers and practitioners understand how these theories might be combined within the field of project management.

Using a grounded theory methodology we developed an initial model based on a review of the extant literature and our experiences as project management practitioners. This model was tested against two case studies and revisions were made to the model. The revised model was then tested by a focus group. The data provided by that focus group was utilized to further refine the model, before being presented in this paper.

Our research culminates in the development of the Final State Convergence Model. This model appears to address a number of the directions that the Network recommended for additional research in project management. Firstly, our model helps explain the ‘lived-experiences’ of project managers. Secondly, our model is supported by a broader theoretical basis than just the traditional project management body of theory.

6.7 Research problem

Project management researchers and practitioners are becoming increasingly aware of a widening divide developing between project management theory, the environment in which project managers are required to operate, and the practices and tools adopted to deliver projects (Williams, 1999, McKenna and Whitty, 2012, Koskela, 1999, Cooke-Davies et al., 2007).

To investigate this in more detail the UK’s Engineering and Physical Sciences Research Council commissioned a research project, The Rethinking Project Management Network (the

Network). The goal of this research project was to explore how the discipline of project management could be expanded beyond the traditional conceptual foundations into new areas which could augment and enhance the theory and practice of project management (Winter et al., 2006). The research undertaken by the Network found that there was “... *a strong need for new thinking to inform and guide practitioners beyond the current conceptual base...*” (p.640). In response to their findings the Network presented a framework of five directions which they felt the discipline of project management needed to develop in order to meet the challenges of modern projects.

The Network categorized these five directions into three major themes. First, is the need to develop new theory *about* practice; the second is to develop new theory *for* practice; the third is the development of theory *in* practice. (Winter et al., 2006). Our research is positioned within the categories of theory *about* practice and theory *for* practice.

6.7.1 Theory about practice

According to the Network, the focus of any research into the theory *about* practice should be to assist the project management community to understand the practice of project management (Winter et al., 2006). They recommended research in this category focus on developing “...*new models and theory which recognize and illuminate the complexity of project management...*” and explore “...*new ontologies and epistemologies which extend and enrich our understanding of the actual reality of projects and project management practice...*” (p.643).

Within the theory *about* practice category, the Network call for new models of project management that move away from the simple, life-cycle based models that have dominated project management theory, towards models which can embrace and explain the complexity that many project manager’s experience. These new models may not immediately produce practical tools or systems for application in the daily management of projects however, they should cause researchers and practitioners to contemplate projects from different perspectives and paradigms so that the traditional notions about project management can be challenged and redefined (Winter et al., 2006).

In consideration of the new models which could be developed within the theory *about* practice category, the Network stated that these models will need to emerge from “...*organized interactions between theory and practice, between academics and practitioners...*” (p.643). In other words, any new models developed for explaining and understanding the complexities of project management needs to link theory and practice through the actuality of practitioners ‘lived-experiences’ (Cicmil et al., 2006, van der Hoorn, 2015, van der Hoorn, 2016).

6.7.2 Theory for practice

According to the Network, the aim of research into theory *for* practice should be to develop concepts and approaches to project management that has the potential for practical application. In defining the category of theory for practice, the Network call for “...*new images, concepts, frameworks and approaches to help practitioners actually deal with complexity in the midst of practice...*” (p. 643).

In order to develop new theories for practice, researchers need to create alternative images of project management that not only challenge the traditional, deterministic models but also challenge the assumption that the deterministic model is the actual reality of project management (Svejvig and Andersen, 2015). By challenging these fundamental tenets of project management, researchers can free themselves to re-conceptualize project management. New perspectives and images can help the project management community gain a deeper understanding of what is actually occurring in projects, as well as revealing new practices that may not have been readily apparent when projects were viewed through the lens of classical project management (Morgan et al., 1997, Winter and Szczepanek, 2007).

Within the category of *theory for practice*, the Network outlined directions they believed project management research should explore further. Our research addresses ‘*Direction 4*’ which calls for research that moves from the current, narrow understanding of project management with its assumptions of well-defined starting objectives, lineal and sequential processes and rigidly defined project boundaries, towards a broader conceptualization that can incorporate unclear starting objectives, multiple project purposes, and permeable and contestable project boundaries (Winter et al., 2006, Morris, 2002).

6.8 Literature Review

6.8.1 Rationale for Theory Selection

Three bodies of theory were purposively selected for review in this paper, these are transformational production management, strategic management, and complexity theory.

The purposeful selection of theoretical constructs for examination is not uncommon in a grounded theory methodology. Milliken (2010) notes that grounded theory research often commences with the researcher's own experiences and interpretations of their environment. Furthermore, it is precisely because of these subjective experiences that potential alignment and deviations from existing theoretical constructs are noticed and emergent themes recognized (Milliken, 2010).

We acknowledge that other bodies of theory have been proposed as potential foundations for project management theory. Our research does not discount these bodies of theory, and we propose future research to investigate other theoretical foundations. However, due to the constraints associated with journal article lengths, we had to limit the theories which could be included for review in this paper.

Transformational production management was selected because it has already been proposed as the traditional basis for project management theory (Koskela and Howell, 2008). Many of the processes and tools utilized in modern-day project management have been developed from underpinning theories of transformational production management (Vidal, 2008, McKenna and Whitty, 2012). We felt it was important to consider the traditional theoretical foundations of project management within our research so as not to summarily 'abandon' the extant project management body of thought by assuming that the classical theoretical foundations are 'worthless' (Winter et al., 2006)

Strategic management was selected because previous research has already identified it as a possible complementary theory to the traditional project management paradigm (Patanakul and Shenhar, 2012, Davies and Hobday, 2005, Killen et al., 2012, Jugdev and Mathur, 2006). Strategic management theory appears to share commonalities with project management. Specifically that both practices attempt to provide temporary and unique outcomes (Tse and

Olsen, 1999, Hitt et al., 2011, Porter, 1980, Project Management Institute (U.S.), 2013); both require the codification of intangible concepts at inception (Schaap, 2012, Mintzberg, 1994, Hart, 1992, Ingason and Jónasson, 2009); both are applied in complex environments characterized by unpredictability and dynamism (Bracker, 1980, Steiner and Miner, 1972, Mintzberg, 1973, Hällgren and Wilson, 2008, Ives, 2005a); and the practitioners in both fields approach their subject matter as generalist, rather than specialists (Steiner and Miner, 1972, Williams and Samset, 2010).

Complexity theory was selected primarily because it provided a potential basis for understanding the dynamic environments in which project managers operate (Tsoukas, 1998, Collyer et al., 2010, Collyer and Warren, 2009). Aritua et al. (2009) have noted that, traditionally, the practice of project management has been dominated by hard paradigms and reductionist techniques which fail to address the chaotic nature of the project management construct. Researchers such as Cooke-Davies et al. (2007), Baccarini (1996) and Pollack (2007) have all identified the benefits that Complexity Theory might offer to the discipline of project management.

6.8.2 Transformational Production Management

Koskela (2000) argues that project management has previously been classified as a subset of production and operations management. More specifically, that it has been adapted from the transformational production management body of theory (Koskela and Ballard, 2006, Koskela, 1999).

There does appear to be merit in this perspective as the theoretical foundation of production management can be readily seen in many of the frameworks and methodologies employed by project managers. Project management tools and practices such as the Gantt chart, Work Breakdown Structures, and the 'Iron Triangle' are based on reductionist techniques that can be traced directly to transformational production management theory (Koskela and Howell, 2002a, Vidal, 2008, Starr, 1964, McKenna and Whitty, 2012).

Transformational production management theory is founded on three key theories. These are Taylorism, Fordism, and Shewhart's quality control theories (McKenna and Whitty, 2012,

McKenna and Whitty, 2013, Koskela and Howell, 2002a, Wright, 1993, Williams, 1999). Usher (2014b) has suggested that each of these theories is borne from certain assumptions that may not be supported by practitioner's 'lived experience'.

Taylor's theory of scientific management (Taylorism) is underpinned by assumptions that the sum of the whole (work) can be decomposed into a number of smaller elements (tasks) without losing any value (Starr, 1964); that the production process, once scientifically-planned, will not need to be changed by the workers (i.e. the production environment is stable and tasks maintain linearity and sequentiality) (Koskela et al., 2007); that all deviations from the scientifically-planned process will produce less than optimal outcomes (Pruijt, 2003); and that workers lack the ability, intellect or creativity to improve on the scientifically-planned process (Taylor, 1911).

Braverman (1998) outlines how Fordism was developed from Taylor's theories and carries with it all of Taylor's foundational assumptions. However, Fordism was further developed to incorporate the assumptions that tasks, workers and machinery can be further decomposed to create a single economic unit for the purpose of controlling cost (Williams et al., 1992); and that production efficiency and cost reduction is best served through the application of a 'push-system' whereby the preceding production process relentlessly drives inputs into the subsequent processes without any consideration as to whether these downstream processes have the capacity to accept the new work (Naruse, 1991, Braverman, 1998).

Shewhart's quality theory is based on the assumptions that the production process is highly repetitive which allows for continual adjustment within a strictly controlled environment; that the scientific method of delivery (Taylorism) invariably produces the most efficient method of production (Shewhart, 1931); and that exact quality outcomes can be achieved if enough management oversight is applied during the production process (Boje and Winsor, 1993).

6.8.2.1 A model of Transformational Production Management

From these three theories (Taylorism, Fordism and Shewhart) a model of transformational production management has evolved. Starr (1964) argues that, regardless of the level of complexity required, production can always be viewed as a basic input-output system.

The transformational model of production management starts with a client's needs. The fulfilment of these needs requires *inputs* (resources) to undergo some form of *transformation*. This transformation process modifies these resources into the form desired and then discharges them as *outputs* which ultimately *satisfies* the client's original needs. (Starr, 1964). This system is shown in Figure 6-2.

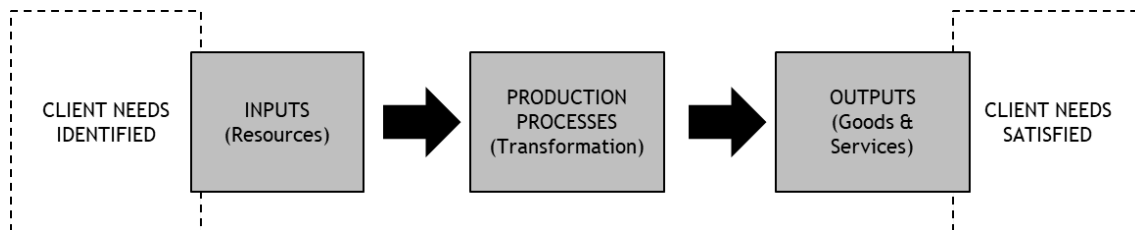


Figure 6-2: Transformational production management model

In reviewing the transformational model of production management, we felt this model appeared to provide a suitable meta-level construct for explaining the practice of project management. However, we also felt that many of the assumptions which have been used to develop this model do not support the practitioner's 'lived experience' - specifically, the assumptions regarding linearity and sequentiality of the processes and tasks, and that project management is conducted in a stable delivery environment (Gudienė et al., 2013, Usher, 2013, Hällgren and Wilson, 2008).

6.8.3 Strategic Management theory

Henry Mintzberg (1989) proposed ten schools of thought within the strategic management body of theory. These can be thought of as ranging from purely deliberate to purely incremental theories (Mintzberg, 1994, Mintzberg, 1990, Mintzberg and Waters, 1985, Wiesner and Millett, 2012, Mintzberg, 1989). For the purpose of this paper we will review only two of these schools of thought, these are the Deliberate (Design) School and the Emergent (Incremental) School. We elected to address these two schools of thought as they have been recognized as the polar opposites on the strategic management continuum (Neugebauer et al., 2015, Mintzberg and Waters, 1985) and therefore we considered these to encapsulate the entire strategic management body of theory between them.

6.8.3.1 *Deliberate (Design) School*

The Deliberate School (Design School) advocates a methodical and analytical approach to strategy development (Acur and Englyst, 2006, Pettigrew, 1992). Strategist adopting the Deliberate school of thought assess their Organisation's external environment for opportunities and threats, and critically evaluate its internal capabilities for strengths and weaknesses (Andrew, 1987, Fletcher and Harris, 2002, Hitt et al., 2011, Johnson et al., 2011). This assessment allows planners to formulate and codify specific strategies into formalized statements and present them to implementers (Schaap, 2012, Hart, 1992, Mintzberg, 1994).

Deliberate strategies have easily recognizable characteristics. Firstly, they express their ultimate goal as a complete, priori statement of intent before the commencement of the implementation process (Mintzberg, 1987, Wiesner and Millett, 2012). Secondly, they rely heavily on detailed planning (Söderholm, 2008, Perminova et al., 2008). Finally, they evaluate progress against predetermined performance metrics (van der Hoorn, 2016, Milosevic and Srivannaboon, 2006, Usher and Whitty, 2017c).

6.8.3.2 *Emergent School*

The Emergent school (Incremental School) postulates that within complex and dynamic environments the concept of adhering to a complete, priori statement of intent is illogical and futile (Quinn, 1978, Neugebauer et al., 2015). The Emergent school advocates that strategies must remain adaptive if they are to meet the challenges that can arise in dynamic environments (Loasby, 1967, Fletcher and Harris, 2002).

The Emergent school argues that the only logical means for coping with a dynamic environment is to let the final outcome be shaped and formed by it (Quinn, 1978, Neugebauer et al., 2015, Garg and Goyal, 2012). The Emergent school postulates that optimal outcomes can only be achieved by allowing the countervailing forces of risk, opportunities, threats, and new information to create an unintended order from broad guiding principles (Quinn, 1978, Mintzberg and Waters, 1985, Wiesner and Millett, 2012, Johnson et al., 2011).

6.8.3.3 Deliberate and Emergent models

The Deliberate and Emergent schools of Strategic Management are two different processes for arriving at a realized strategy (Johnson et al., 2011, Rose and Murphy, 2015). Figure 6-3 provides a conceptualization of these two schools as originally envisaged by Mintzberg (1994). The fundamental concepts of this original model are still accepted by strategy academics in the modern era, testifying to the efficacy of the original model (Johnson et al., 2011).

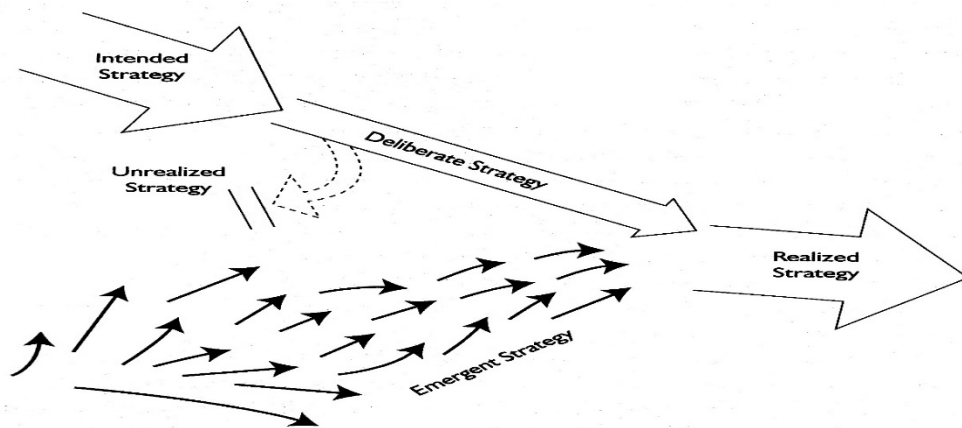


Figure 6-3 - Deliberate vs Emergent Strategies
Adapted from Mintzberg and Waters (1985)

This model suggests that a realized strategy can be achieved either by the application of a Deliberate strategy (i.e. pre-existing plans that are monitored and controlled to achieve the required outcome), or an Emergent strategy (i.e. the realized strategy is shaped by environmental forces). However, this model also implies that these processes are mutually exclusive.

We felt that this exclusivity may present some difficulties when applied to the practice of project management. Usher (2014b) notes that project manager's exhibit characteristics of Deliberate strategy when they develop Project Management Plans, schedules and cost plans, while concurrently exhibiting characteristics of Emergent strategy when adapting these plans to a dynamic Construction environment.

6.8.4 Complexity Theories

Hawking (2000) predicted that the 21st century will be the century of complexity. This forecast has never been more true than in the field of project management. The Project

Management Institute (2013) states “...*complexity is not going away, and will only increase...*” (p.5) and Bakhshi et al. (2016) claim that complexity is one of the most important issues facing modern project management. In light of this, it would appear that complexity theory should be considered when attempting to augment the current theory of project management.

Complexity theories are developed from a broad range of academic fields including mathematics, life sciences and physical sciences. Complexity theories differ from other theories in that they attempt to, not only explain ideas and objects but also to address the complex nature of the relationships that exist between these elements. Complexity theories have been applied to model dynamic systems such as weather patterns, viral infections, natural disasters, traffic networks and the world market (Ottino, 2003, Weick, 1990, Sellnow et al., 2002, Cooke-Davies et al., 2007).

Complexity theories attempt to explain how order, novelty and structure can arise from chaotic systems or how diverse behaviours can emerge from seemingly simple rules (Tsoukas, 1998, Cooke-Davies et al., 2007, Levy, 2000). Over recent years, researchers have been investigating how complexity theory can increase our understanding of project management (Williams, 1999, Melgrati and Damiani, 2002, Richardson et al., 2005, Pollack 2007, Bakhshi et al., 2016, Ireland, 2013).

Complexity theories can help us understand complex adaptive systems. Stacey et al. (2000) explain that complex adaptive systems consist of a large number of interconnected elements and agents. Because of this plethora of connections, complex adaptive systems may appear to be chaotic however, these systems actually behave according to their own set of order-generating rules (Zuo and Tie, 2016, Toner and Tu, 1998).

He et al. (2015) and Fernandez-Solis (2013) argue that Construction projects are complex adaptive systems. Construction projects exhibit primary and secondary inter-relationships between their elements; they are open system that perform adaptively; they are self-organizing and have emergent tendencies; they consist of agents whose behaviours adapt to dynamic environments; they incorporate multiple feedback loops; and they progress in non-linear sequences (Cvitanovic, 1984, Thiétart and Forgues, 1995, Tsoukas, 1998).

Because of the adaptive behaviour and interconnectivity that exists between agents in complex adaptive systems, these systems need to be considered as more than the sum of their individual parts. That is, the benefits, risks and challenges faced within these systems cannot be completely capitalized on, or mitigated, using reductionist tools or systems. (Aritua et al., 2009, Cooke-Davies et al., 2007).

Stacey (2007) identifies three models of behaviour within complex adaptive systems. These are (i) stable equilibrium; (ii) explosive instability; and (iii) bounded instability. Tetenbaum (1998) highlights that complex adaptive systems which display the characteristics of bounded instability can transform unpredictable disorder into irregular but similar forms, not unlike snowflakes which are all unique but all have six sides. Stacey (2007) notes that systems which display bounded instability appear to have the greatest ability to transform themselves and gain the most advantage from their environment.

Burnes (2005) highlights that systems which operate under the conditions of bounded instability are “...*continually poised at the edge of chaos...*”(p.79). It has been argued that a complex adaptive system which is constantly at the edge of chaos is operating at its optimal performance (Lewis, 1994, Kauffman, 1993). However, as Burnes (2005) rightly identifies, the conditions which create optimal performance in these systems can very quickly cause the system to devolve into utter chaos thereby causing the destruction of the system itself.

Anderson (1999) explains that the governing factor in whether a complex adaptive system operating under conditions of bounded instability operates effectively, or brings about its own destruction, is the number of interactions within the system which stay within the upper and lower limits of the order-generating rules. Where interactions between agents within the system remain between the upper and lower limits created by the order-generating rules, the feedback loops remain connected and the system can continue to adapt. However, if the interactions remain outside the limit of these rules for any length of time the system itself can become hopelessly and irrevocably unstable (Simon, 1996, Dasgupta, 2016)

Identifying a single model that conceptualizes complexity theory is extremely difficult. The primary reason for this is that ‘*complexity theory*’ is not a cohesive theory (Ireland, 2013), rather it is a group of ideas regarding the dynamics of change in complex systems (Ferreira,

2001). As a result, there is a myriad of models postulated to conceptualize complexity theory, and none of these is universally accepted as an accurate representation.

Although a single model has not been accepted, researchers commonly use network diagrams to conceptualize complexity theory (Strogatz, 2001, Boccaletti et al., 2006, Newman, 2003). These diagrams are utilized because they help visualize the non-linearity and non-sequentiality that can exist in a complex system (Figure 6-4). Although having many benefits in the conceptualization of complex systems, we felt network diagrams had very little to offer project managers by way of practical tools for navigating the project management process.



Figure 6-4: A simple network diagram

6.9 Research Question

A review of the literature has identified a potential disparity between the traditional project management body of theory and the ‘lived experiences’ of project management practitioners. Other researchers have proposed transformational production management, strategic management and complexity theory as a possible means for addressing this. These bodies of theory appear to help explain some elements of the project management experience, but none completely reconcile the theory-praxis divide.

The transformational production management body of theory appears to provide an acceptable meta-level construct to explain project management however, its assumptions of linearity, sequentiality and environmental stability do not appear to be supported by the current body of project management knowledge.

The strategic management body of theory may provide some context for the ‘lived experience’. However, the exclusivity for realizing the project’s Final State that is implied within the Deliberate and Emergent Schools may prove problematic in the project management construct.

Complexity theory addresses the issues of non-linearity and non-sequentiality, as well as providing a means for conceptualizing complex systems. However, no universally acceptable models of complexity theory exist and network diagrams provide little assistance in terms of practical tools for managing projects.

In addition to all this, there does not appear to be any discussion in the extant literature as to how these bodies of theory might relate to each other, or when and how project managers should apply each of them to optimize their combined use.

Therefore a valid research question would appear to be:

“Can a model be synthesized from the transformational production management, strategic management and complexity bodies of theory that illuminates the complexities of projects and provides a broader conceptualization of the ‘lived experience’ of project management?”

6.10 Research Methodology

Our research utilizes a grounded theory methodology which presupposes a subjectivist ontology (Locke, 2003). Glaser and Strauss (1967) characterize this research approach as one oriented towards the inductive generation of theory from data that has been systematically obtained and analyzed. The grounded theory methodology is especially suited to generating theory and developing novel models which relate to social processes (Glaser and Strauss, 1967, Glaser, 2014, Bryant and Charmaz, 2007).

Grounded theory research is undertaken within a specific context and develops through a simultaneous, non-sequential process of data collection and analysis (Glaser and Strauss, 1967, Locke, 2003, Milliken, 2010). The grounded theory methodology is an iterative process which cannot be formally planned in advance, as it must remain flexible enough to react responsively

to emergent themes (Wastell, 2001). Franco (2005) highlights that this iterative process creates both time and space within the research to allow a deeper understanding of the key research issues to develop.

6.10.1 Overview of grounded theory as applied to this study

Our research took place over a six month period. The grounded theory methodology was applied to our study in ten steps across three stages (Figure 6-5). The initial planning involved a preliminary review of the extant literature to allow conceptual sensitization (Milliken, 2010) and reflection on the researchers' own experiences to inform and guide the initial research (Blumer, 1969). As a result of this process the first model (Figure 6-6) was developed.

This first version of the model was tested against two historical case studies. Case studies within a grounded theory study can be viewed differently to those utilized in a positivist approach (Patton, 1990). In grounded theory, case studies can be purposively selected and can become an object of study in themselves (Stake, 1994). This is the approach that we have taken in this paper, and as such, we would consider the case studies contained within this paper to fall into the 'instrumental' classification as noted by Stake (1994, 1995). These case studies were purposively selected because of the potential insights they appeared to offer into this area of research.

Based on these case studies a second version of the model (Figure 6-9) was developed. This was tested in a focus group. Using the data collected in the case studies and focus group, we reassessed the model against the categories identified in the preliminary review before proposing it as the final model for consideration in this paper.

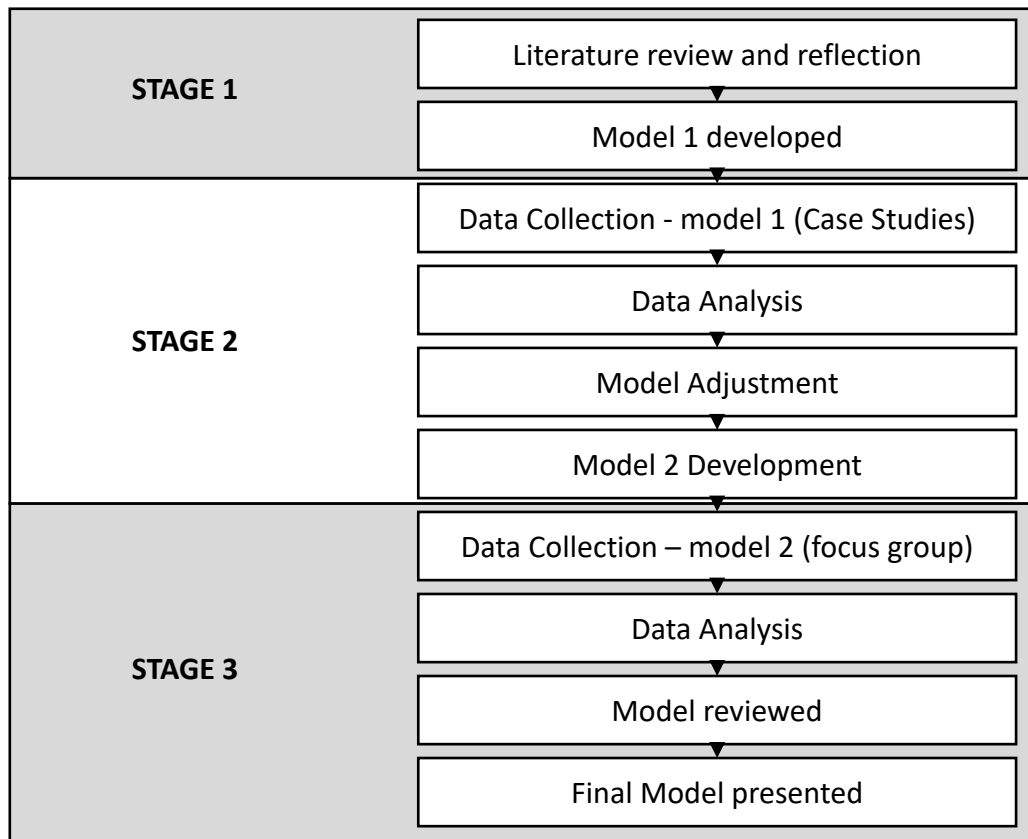


Figure 6-5: Research methodology

6.10.2 Grounded Theory methods of analysis

The data collected during each of the research stages was evaluated using a general inductive approach. As recommended by proponents of the grounded theory methodology, the data collected in our case studies was first segmented and then coded (Glaser, 2007, Glaser, 2014, Glaser and Strauss, 1967, Locke, 2003, Milliken, 2010, Bryant and Charmaz, 2007).

These codes were entered into a qualitative software program (NVivo 10) where they were subjected to numerous reviews in order to identify dominant or frequent themes (categories). Once identified, these categories were conceptualized into elements which were used to form components in the model.

These categories, now in the form of the model, were tested again through a different data collection method (focus group) to achieve data triangulation (Glaser and Strauss, 1967, Locke, 2003). The process used to develop the model is outlined in more detail in the following section.

6.11 Model development

6.11.1 Version 1 of the Model

Researchers such as Aggerholm et al. (2012), Joiner et al. (2002) and Glaser (2014) have noted the misinterpretations that can arise when technical people use jargon to discuss their discipline. To mitigate this risk we made a decision to avoid the use of traditional project management definitions and terminology where possible. For us, this began by reconceptualizing the definition of a project.

Van der Hoorn & Whitty (2015) conceptualize the experience of project work to be a situation that arises when there is a lack of innate capability of the individual or Organization to deal with the work at hand. This deficit may exist for a range of reasons including, but not limited to, a lack of technical ability; a decision not to use their technical capability for this project process; risk reduction; or to ensure probity.

Building on the concept of ‘*capability deficit*’ we adapted Pich et al ‘s (2002) work and defined a project as: “*The process of transitioning from a Start State to a new Final State in an environment in which the client Organization acknowledges they have a capability deficit.*”

With a new definition of projects agreed, we commenced the development of our model by reflecting on our experiences and reviewing the extant literature on transformational production management, strategic management and complexity theories as they related to project management. Based on this data we developed a preliminary model for testing (Figure 6-6).

Our model conceptualizes a project as moving through the five stages outlined in the transformational theory of production management. These are Needs, Inputs, Transformation, Outputs and Satisfaction. The project transitions from an existing state which we term the Start State Existing to a new state, which we term the Final State. This transition takes place across a set time period and within certain boundaries which are the parameters set by the Client. These parameters may include budget, functionality, unique Organisational requirements, etc. These

parameters create the Extent of Acceptable Final States from which the Final State could potentially emerge.

In our model, the green triangles represent points in the project management process when the project manager needs to make a decision about what course of action to pursue. At each of these decision points, there is a range of potential actions available to the project manager. These actions (black arrows) represent the possible pathways available to achieve the project's final outcome and stand in contrast to the linearity and sequentiality that underpins the transformational production management body of theory.

Where these choices result in an action that moves towards the Final State and remains within Extent of Acceptable Final States, an elaborating choice can be made (i.e. movement from one green triangle to another). Conversely, if the action results in an unacceptable outcome, one that will end outside the Extent of Acceptable Final States, the action cannot be pursued further. In our model, this action is represented by an arrow from a green triangle to a red hexagon.

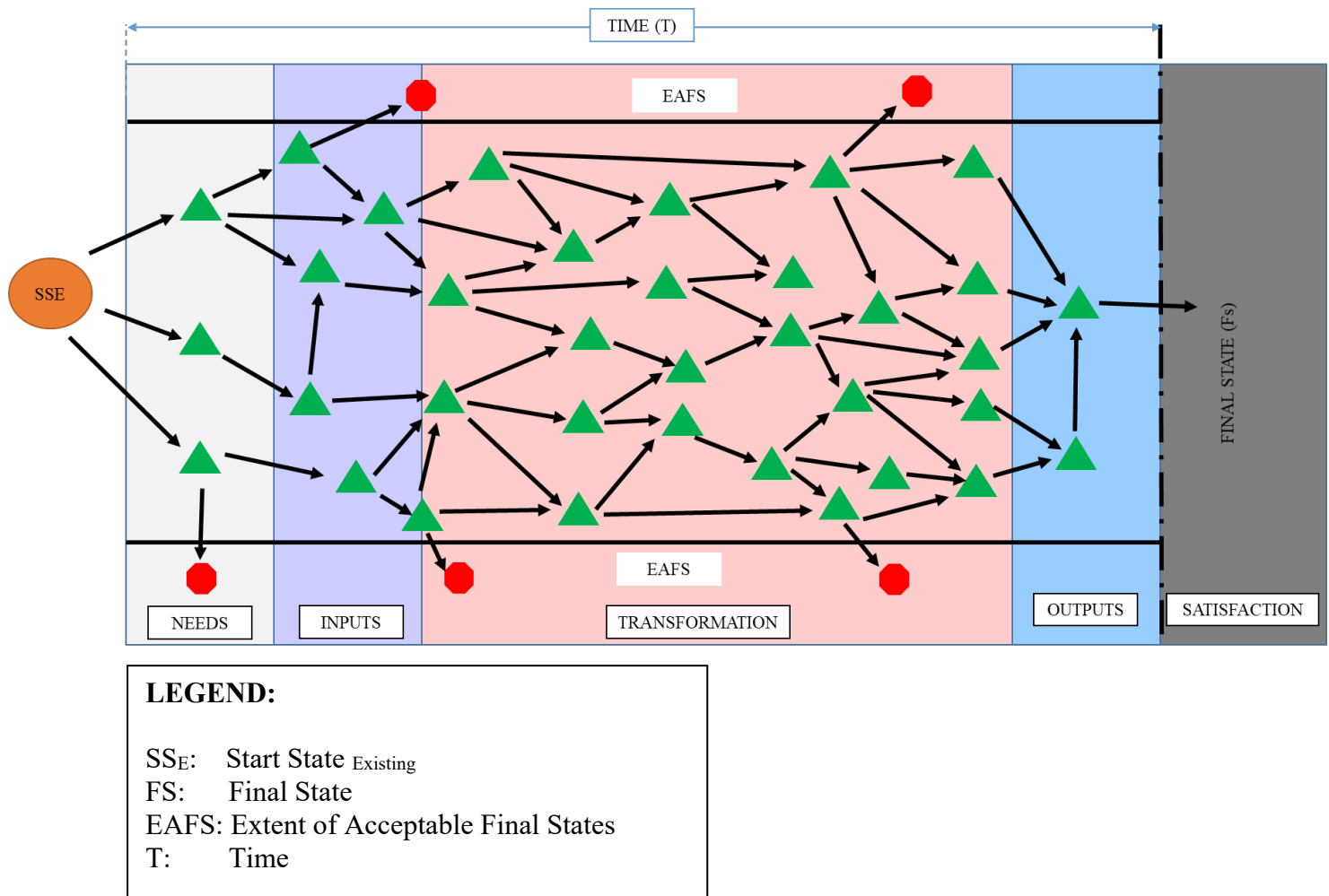


Figure 6-6: Conceptual Model (v1)

6.11.2 Testing Version 1 of the Model

With a preliminary model developed, we tested it by reviewing it against two projects which were purposively selected as case studies for this research. The rationale for selecting these projects as cases studies was that:

- (a) Both projects had been completed within 12 months of the development of the model. Thus the process was clearly recollected; and
- (b) Researcher 1 had been involved in the projects from inception to completion. Hence, the model could be tested against the entire project management process.

Before undertaking the coding process we outlined five themes that we felt would need to be identifiable to support the preliminary model we had developed. These themes and their definitions are included in Table 6-3.

Table 6-3 - Themes and definitions

Theme	Definition
Parameter	A constraint which defines the Extent from which the Acceptable Final State can emerge.
Expectation	A characteristic or event which provides an understanding of the stakeholder's expectations of the project outcomes.
Pathway	A point or event at which multiple possible directions could be selected and from which a different path to the final outcome could be created.
Satisfaction	An event which impacts stakeholder's feelings of satisfaction with the project.
Success	Objective criteria which indicated whether the project could be considered a success or failure.

6.11.3 Case Study 1

This project was delivered for the Australian Department of Defence. The purpose of this project was to develop a close training area facilities to support new capabilities for seven User Groups. The project was delivered in accordance with the Department of Defence's traditional Head Contract process. At the end of the design review process, tenders were called and evaluated in accordance with the Commonwealth Procurement Guidelines. A preferred tenderer was selected for the purpose of negotiations.

Prior to the commencement of contract negotiation with the preferred tenderer, the Sponsor's representative was deployed to another posting and a new representative was appointed to the project.

During the negotiation period, the new Sponsor's representative advised all parties that the project budget had to be reduced by 43%. The project manager undertook a scope reduction

workshop with the new Sponsor's representative and User Groups. The outcome of this workshop was a reduced project scope and an endorsed, prioritized, and costed list of scope items to be reintroduced into the project as risks were retired and contingency funds were released. The Contractor agreed to the reduced scope and the construction contracts were duly executed.

The physical construction of the facilities took 9 months. Throughout this process, the project manager met with the Sponsor's representative and User Groups at least monthly. All variations were reviewed and approved by the Sponsor's representative prior to being executed by the project manager.

During construction, the project manager worked collaboratively with the Contractor and the Sponsor's representative and User Groups to implement the risk mitigation strategies necessary to reduce the contingency allocations. As the Works progressed and risk contingencies were retired, the project manager was able to reintroduce three previously removed scope items from the endorsed scope list.

Two weeks prior to Practical Completion the original Sponsor's representative was reintroduced to oversee the final delivery of the project. During his absence from the project the original Sponsor representative had no visibility of the project nor was he involved in any of the communication regarding scope reduction, risk mitigation strategies and reintroduction of deliverables.

The project was completed 0.15% under budget. The Contractor was awarded Practical Completion two days prior to the contracted date for Practical Completion. All identified defects were rectified and closed out to the satisfaction of the Sponsor's representative and User Groups.

Following Practical Completion, the project manager facilitated a Post Occupancy Evaluation and Lessons Learnt workshop. This workshop was attended by the both the original and new Sponsor's representative, the User groups, design services consultants, the Contractor and the project manager. At this meeting, the Sponsor's representatives and User Groups commended the project manager and Contractor for completing the project on time and under budget. However, they also expressed their dissatisfaction with the project stating the reduced, final

project outcomes seriously impacted on the operational functionality and capability requirements originally envisaged. In particular, the original Sponsor's representative expressed displeasure regarding the facilities that were removed from the scope as a result of the reduced budget.

6.11.4 Case Study 2

This project was undertaken for a not-for-profit service provider in Australia. The stated objective of this project was to prepare a business case for the development of a mixed-use, intergenerational, community living precinct. The project manager was engaged to undertake scope definition through focus groups, semi-structured interviews and workshops; procure the technical disciplines required to develop a master-plan; and draft a business case for endorsement by the Sponsor's governing body.

The development was planned to take place across eleven separate land titles, held by two business units within the client Organisation. One of the business units held title over three lots but had minimal liquid assets available for development. The second business unit held title over eight lots and had sufficient liquidity to undertake the development.

To gain approval through the Organisation's governance structure the project manager was required to obtain endorsement from five levels of governance with representatives from ten different departments. Many of these representatives had not been involved in any large-scale Construction projects before.

Four master-planned options were approved for inclusion in the final business case. Multiple funding options were explored for each master-planned option and the associated financial hurdle rates were assessed. At the submission of this deliverable, the project had run 25 weeks over the original forecast (75% over time) and was 39.7% over the original project budget. During the delivery of the project, one of the business units (the three lot title holder) had extracted themselves from the process and advised they did not wish to be involved with any further development plans.

At the presentation of the business case, the remaining Organisational representatives unanimously commended the project manager for successfully developing the business case,

managing the complex stakeholder and governance environment, and mentoring the Sponsor's governance team.

As a result of this project, the not-for-profit Organisation has since requested two more business case submissions for different development sites and engaged the project manager to oversee the Development Application process for the first stage of Construction.

6.11.5 Findings from the testing of Version 1 of the model

We analyzed the model against the cases studies by identifying specific incidents that fulfilled the definition of the themes that we had established (Table 6-3). Some examples of the process from each case study are provided in Figures 6-7 & 6-8.

Having analyzed data from these case studies, we felt that the model adequately captured the two of the themes that we were looking for. Firstly, the model demonstrated the concept of parameters which define the boundaries of the project. These parameters are represented by the Extent of Acceptable Final State lines. Our model also highlighted how certain actions could result in outcomes that were either inside or outside of those defined parameters. Secondly, we felt the model captured the theme of pathways by highlighting how there can be many ways the project can develop to achieve the required Final State.



However, we also felt the data from the case studies revealed some shortcomings in the model. Specifically that the model did not:

- (i) Reflect that the parameters can change as the project progressed as seen in the Case Study 1 budget reduction, and in the withdrawal of the Business Unit in Case Study 2;
- (ii) Demonstrate that many stakeholders had different expectations regarding the project outcomes. In other words, there were different perceptions about the project's Final State and not a single unified vision of the project's Final State.
- (iii) Identify that some of the stakeholder's perceptions regarding the project's Final State appeared to be outside the project's parameters;
- (iv) Conceptualize the need for the project manager to help the stakeholders redefine their perceptions of the Final State as the project parameters changed; and
- (v) Reflect that the changing parameters had the potential to impact on actions that the project manager had already taken.

6.2 Version 2 of the Model

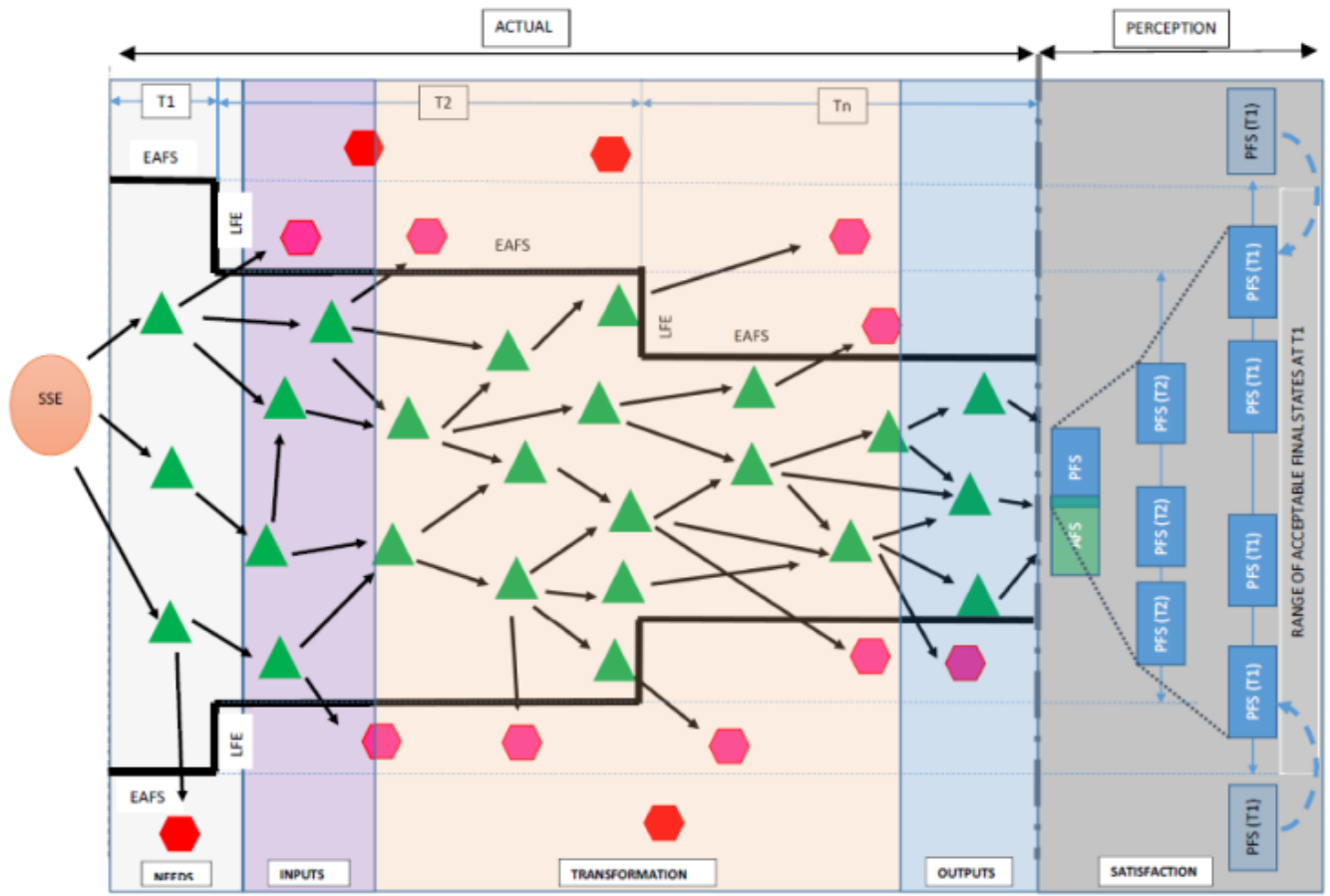
As a result of the case study analysis, we revised the model as shown in Figure 6-9. The revised model introduces two separate sections – 'Actual' and 'Perception'. The blue boxes on the far right represent the different perceptions that can exist regarding the project's Final State. These multiple Perceived Final States can exist where there are multiple stakeholders. These different perceptions at the time of commencing the project are designated PFS (T1).

Additionally, the revised model highlights that the project's stakeholders may not have a unified understanding of the final project outcome. The transparent blue boxes in this column represent Perceived Final States which are outside the Extent of Acceptable Final States. The blue dotted arrows in this section indicate project managers must help stakeholders redefine their expectations so that they fall within the bounds of the achievable outcomes.

The revised model introduces the concept of flexible parameters from which an acceptable Final State can be developed and highlights how the Extent of Acceptable Final States change due to specific events. We have designated these ‘Limiting Factor Events’ and they can occur at any time throughout the transition process. The impact of the flexible parameters is demonstrated in the model by the steps in the Extent of Acceptable Final States and the inclusion of new time designators (T2 & Tn) at the juncture when the parameters changed. An example of a Limiting Factor Event is the budget reduction in Case Study 1, and the withdrawal of the development partner in Case Study 2.

Limiting Factor Events can create a number of changes in the development of the project. Firstly, actions which had already been taken and would have previously resulted in acceptable outcomes (i.e. green-to-green movement), may now result in actions that can no longer be pursued (i.e. green triangle to pink hexagon). Secondly, the Limiting Factor Events change the range of acceptable Final States. This also results in a variation to the range of Perceived Final States that are available. In the model, this is represented by the second column of blue boxes, which are nominated as PFS(T2)

Upon reflection, we realized that there will be a time in the project when the Perceived Final States and the project’s Actual Final State will converge. This is indicated in our model by the blue and green boxes on the third column in from the right-hand side. These boxes help conceptualize the feelings of displeasure voiced by the Sponsor’s representatives in Case Study 1 and the commendations voiced in Case Study 2. We hypothesized that the degree of stakeholder’s dis/satisfaction with the project outcomes is proportional to the quantum by which these two states, the Perceived Final States and the Actual Final States converge. It is from this hypothesis that the name of the model, the ‘Final State Converge Model’, was derived.

**LEGEND:**

SSE:	Start State Existing
EAFS:	Extent of Acceptable Final States
LFE:	Limiting Factor Event
$T1 - Tn$:	Time
AFS:	Actual Final State
PFS:	Perceived Final State at Completion
PFS ($T1, T2$):	Perceived Final State at Time $T1$ and $T2$

Figure 6-9: Conceptual Model (v2), the 'Final State Convergence Model'

6.11.6 Testing Version 2 of the Model

With the refinements made to the model, we tested the Final State Convergence Model in a focus group at Point Project Management (Brisbane) in March 2015. Invitations to participate were emailed to all 23 staff members. Seven project managers accepted the invitation. This sample size was considered acceptable for this stage of the study based on previous research

by Kotter (1999), Mumford and Gold (2004) and Algeo (2012) which demonstrates that a sample size of five can be considered valid for a targeted research study such as ours.

The seven participants were provided with a pre-reading pack prior to the focus group. This pack included a summary of transformational production management, strategic management and complexity theories, a brief explanation of the model, and a summary of its development.

Researcher 1 facilitated the focus group. The participants included one Senior Project Manager (+10 years' experience), four Project Managers (2 – 10 years' experience) and two Assistant Project Managers (< 2 years' experience). Two participants were female and five were male. The participants had a range of previous Construction project management experience including Defence, Commercial, Aviation, and Retail projects. Five of the participants had been involved in major Construction projects, while two had experience in fit-out projects. All participants were currently managing projects.

The focus group commenced with Researcher 1 providing an explanation of the purpose, development and elements of the Final State Convergence Model. The focus group were asked if they felt the model, as it was described to them, accurately reflected their experiences as project managers. All of the participants agreed that it did with four participants providing more detail.

“...[the model] outlines the fluid nature [of projects] ... and presents a more accurate reflection than the production management model...” (PM01).

“...[the model demonstrates] how the project manager must ‘navigate’ through the project...” (PM 02)

“...[the model] displays a higher level of conceptualization of the project management experience than the production management model...” (PM03)

“...[the model provides] a more realistic explanation of the role of the project manager than the other models...” (PM06)

One participant (PM03) felt that the model did not adequately capture the influence that the project manager exerted in driving the project towards the Final State. Upon further discussion, the participants agreed that while the transition process dictated many of the decisions that could be made, it was the role of the project manager to guide the project towards a successful completion. The participants felt the Final State Convergence Model conceptualized the project manager as a “...*helpless spectator*...” (PM03) rather than a driving force in achieving successful project outcomes.

In addition, the focus group participants agreed that it was possible for project managers to make decisions that progressed towards the Final State however, this did not necessarily mean these decisions created the optimal outcome. The participants felt the model needed further development to capture how project managers added value to the overall process. It was noted by the participants that the Final State Convergence Model did not appear to capture the reporting, monitoring and controlling activities that project managers undertook during the transition process.

The participants also felt that the Final State Convergence Model did not adequately explain how the Actual Final State was achieved when considering the multiple pathways available in the transition process. As a result, the participants felt the model needed to be developed further to demonstrate how the project manager directed the project outcomes.

When asked if the if the Final State Convergence Model altered the participant’s understanding of their role as a project manager, three participant’s indicated it did, with two providing more clarification, stating the model:

“...[the model] highlighted the difference between ‘project success’ and ‘client satisfaction’...” (PM01).

“...[the model] gives you the feeling that you are not only engaged to deliver the project but to [manage] the Client’s levels of satisfaction throughout the project...” (PM03)

When asked whether the Final State Convergence Model altered the participant's understanding of the importance and/or reasons why project managers used certain tools, four participants indicated that it did:

"...I believe the tools and systems can be used in a more efficient way if the Final State Convergence Model was implemented...rather than just a single critical path, numerous paths would be analyzed..." (PM01)

"...[the model] shows that the tools (risk registers, program, cost, etc.) are not only used as a guide for us [project managers] to deliver the project, but a guide for the Client to accept the delivered project..." (PM03).

"...[the model draws your attention] to ensuring the Client is kept informed of the implications of changes, rather than just a simplified monthly reporting of progress, cost and quality..." (PM04).

"...[the model] shows that using the tools and systems does not guarantee success..." (PM06).

When asked for general comments regarding the model itself, two participants responded:

"...I don't believe that 'incorporating' the Final State Convergence Model on a project actually changes the way projects are delivered – the Final State Convergence Model happens regardless! I see it as a more of an explanatory model to why projects occur the way they do, as opposed to a tool that can be followed." (PM02)

"...[The] model may be very useful in redefining how tools are categorized and applied, and cause a project manager to more selectively apply tools having a real understanding of the effect that is intended to be generated rather than by rote usage of an established "way"..." (PM03)

6.11.7 Findings from the testing of Version 2 of the model

Based on the data collected we felt the model generally reflected the experiences of the focus group participants. However, we also felt further research and development of the model was required to:

- (a) Conceptualize the influence that the project manager exerted in driving the project towards the Final State;
- (b) Conceptualise the value that project managers added to the process;
- (c) Capture the planning, monitoring and controlling role of project managers; and
- (d) Explain how the Actual Final State (AFS) is achieved from the multiple pathways available.

6.12 Discussions

The findings of this study are now considered with reference to the research question. The limitations and implications for further research are also discussed.

6.12.1 Final State Convergence Model

Our findings indicate that a model can be synthesized from the transformational production management, strategic management and complexity theories. Our 'Final State Convergence Model' draws from the theory of transformational production management to provide a meta-level 'underlay' to the model. This underlay provides an understanding of how projects move through the five stages of 'Needs-Inputs-Transformation-Outputs-Satisfaction'.

We felt it was important to keep this theoretical construct to reinforce that the most important aspect of any Construction project is to deliver outcomes that both fulfil the initial need and achieve stakeholder satisfaction. In addition, the use of transformational production management as an underlying theoretical basis demonstrates that we do not consider the extant

project management body of thought to be useless, nor do we advocate abandoning the processes and frameworks that have assisted in the evolution of the discipline. By providing this theoretical underlay, the Final State Convergence Model can draw on the existing frameworks, processes and tools that have been developed from the transformational production management body of knowledge.

The Final State Convergence Model also draws from both the Deliberate and Emergent schools of thought within the Strategic Management body of theory. Our model allows for the deliberate planning that project managers undertake to ensure their projects are delivered within set parameters. Concurrently, our model represents the adaptive actions that project managers must undertake when emergent events impact their project. Our model allows for plans to be flexible enough to cater for emergent events that may result in new and unexpected pathways to the Final State.

The Final State Convergence Model draws on elements of Complexity theory by representing the plethora of agents and interactions that can occur during the delivery of a Construction project. Our model demonstrates how Construction projects display the characteristics of bounded instability by representing that the system may appear to be on the edge of chaos, but it is actually functioning within the upper and lower boundaries of the order-generating rules (parameters) set by the clients and stakeholders. Furthermore, our model represents how the process of project management can transform unpredictable disorder of the Construction process into unique outcomes that take on similar forms. Finally, our Final State Convergence Model draws on complexity theory to represent how a predictable outcome can emerge from non-linear sequences.

Our findings also highlight the need for project managers to skillfully manage and influence the expectations of their Clients to ensure the Perceived Final State and the Actual Final State converge. This important aspect of the project manager's role appears to have an impact on the degree of satisfaction experienced by the Client. Interestingly, this critical element does not appear to be captured in any of the bodies of theory reviewed. Table 6-4 provides a summary of our findings.

Table 6-4: Summary of Research Findings

Model component	TPM	SM		CT	FSCM
		Del	Emg		
Set process for delivering a Construction project.	✓				✓
Link to existing Project Management body of theory and frameworks.	✓				✓
Deliberate planning utilized by project management practitioners.	✓	✓			✓
Predictable project outcomes.	✓	✓			✓
Flexibility in planning to respond to emergent events.			✓		✓
Bounded instability.				✓	✓
Upper and lower limits of order-generating rules.				✓	✓
Unpredictable disorder to unique but similar outcomes.				✓	✓
Predictable outcomes from non-linear sequences.				✓	✓
Disconnect between Actual and Perceived Final States.					✓

TABLE LEGEND:

TPM = Transformational Project Management

SM = Strategic Management

Del = 'Deliberate' school of thought

Emg = 'Emergent' school of thought

CT = Complexity Theory

FSCM = Final State Convergence Model

6.12.2 Limitations and Challenges

Although grounded theory methodology advocates the use of personal experience as a basis for identifying areas of potential research, this approach does carry with it the potential for Researcher bias in the data collection and data analysis process. To address this, we have attempted to view the data and emergent themes as objectively as possible and used data triangulation to remove our own bias from the process. However, these processes alone cannot guarantee the findings of this paper are free from our personal bias. Our findings will need to be subjected to further study within a wider context to reduce the potential for Researcher bias.

We purposively selected three bodies of theory as the starting point for investigation - transformational production management, strategic management and complexity theory. We acknowledge that there are other bodies of theory not reviewed in this paper which may impact the future development of the model. The impact of other project management theories on the Final State Convergence Model will be the subject of future research.

Our research was conducted within a limited organizational context and drew from a small number of cases and research participant's experiences. While this is not inconsistent with a grounded theory methodology, we concede that the small number of cases reviewed and the focus group size may have constrained the data collected, thereby impacting the development of the model and the generalizability of the results. To address this, additional research involving a larger cohort and case studies sample is planned to further test the validity, credibility and dependability of the model (Davison et al., 2004, Lincoln and Guba, 1985, Erlandson et al., 1993).

The model itself appears to broadly reflect the 'lived experience' of the cohort of project managers. However, further development is needed in order to address:

- (a) The influence and value that the project manager provides in the transition process;
- (b) The planning, monitoring and controlling role of project managers within the project management construct; and
- (c) How the Actual Final State is achieved from the multiple pathways available.

These questions will be addressed through future research and further development of the model.

6.12.3 Implications for research and practice

6.12.3.1. For Academics

From an academic perspective, our Final State Convergence Model provides a novel approach to synthesizing new bodies of theory into traditional project management theory. It adds to the theory about practice through the development of a new model which not only illuminates the complexities of project management but enriches and extends our understanding of the actual reality of projects and project management practices.

Furthermore, our Final State Convergence Model moves away from the simple, life-cycle models utilized in traditional project management theory and provides a new perspective on project management which can be explored through further research.

6.12.3.2. For Practitioners

From a practitioner's perspective, our research provides a model which may help them gain a better understanding of the environment in which they operate and their role within that environment. Our model may guide them to think beyond their current conceptual base of traditional project management methodologies, systems and processes towards a broader conceptualization of project management.

Our model highlights to practitioners that there may be multiple pathways to achieve the required Final State. It also highlights how linear and sequential thinking may be hampering their ability to achieve the project's ultimate goals.

Finally, our model may help project practitioners understand why some stakeholders may feel dissatisfied with seemingly successful projects.

6.13 Conclusion

The Rethinking Project Management Network identified three categories for development of project management theory. Our research has developed a model which provides new insight into two of these categories, theory *about* practice and theory *for* practice.

Through our research, we have developed the Final State Convergence Model which addresses some of the Network's directions for the theoretical development of project management. The Final State Convergence Model illuminates the complexities of project management, extends our understanding of project management beyond the traditional conceptual base, and provides a conceptualization of project management that moves away from well-defined starting objectives, lineal and sequential processes, and rigidly defined project parameters.

The Final State Convergence Model provides a new perspective on project management. One which can be further developed through future research. In addition, the Final State Convergence Model provides practitioners with insight into how multiple pathways exist within their project environment, and why some stakeholders might be dissatisfied with seemingly successful projects.

7 Managing Paradoxes through Design Thinking.

7.1 Structure Map

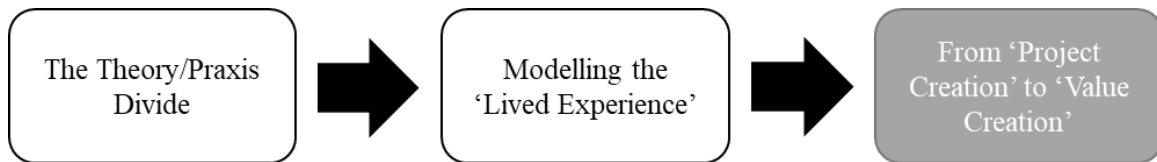


Figure 7-1: Thesis structure map (Chapter 7)

7.2 Preface

This chapter presents an empirical paper which has been accepted for publication by *Project Management Research and Practice*. A precursor to this chapter was presented as a paper titled, “Embracing Paradox: Utilizing Design Thinking in Project Management” at the Australian Institute of Project Management conference in 2017. This chapter begins to address the question raised at the end of Chapter 6 regarding how client-side project managers create value. At the same time, I was also continuing to develop the concept of dualities in the project management construct by investigating two paradoxes that are inherent within Construction projects and how project management practitioners managed these paradoxes. This chapter also introduces the Design Thinking Knowledge Funnel, which provides the foundation for a new discovery in Chapter 9. Finally, this paper discovers a project management tool, which I termed ‘Optioneering’ that is based on key principles of Design Thinking.

7.3 Key points of this chapter relevant to this thesis

Table 7-1: Key themes of Chapter 7 relevant to this thesis.

- Paradoxes (Dualities) exist within the ‘lived experience’ of client-side project managers.
- Demonstrating that client-side project managers adopt Design Thinking to manage paradoxes within Construction projects.
- An introduction of the Design Thinking Knowledge Funnel into the client-side project management body of literature.

7.4 Abstract

SYNOPSIS:

This paper investigates the practice of client-side project management through the lens of paradox theory and focusses on two inherent tensions in the management of construction projects. These tensions are created by the predictable/unpredictable nature of construction and the control/flexibility that is required to deliver construction projects successfully.

RELEVANCE FOR PRACTICE/EDUCATION:

Our research provides client-side project managers with an understanding of the tensions that are inherent in the delivery of construction projects and highlights how these can be managed. Furthermore, our research identifies a practical process, which we termed ‘Optioneering,’ which may assist client-side project managers in the management of the investigated paradoxes.

RESEARCH DESIGN:

This research utilizes a grounded theory methodology to investigate how client-side project managers handle these paradoxical tensions.

MAIN FINDINGS:

Our research indicates that client-side project managers often demonstrate the characteristics of Design Thinking when managing the investigated paradoxes. This type of thinking perceives project work as having both structural and structuring elements; it assumes multiple

pathways available to resolve issues; it moves through a defined Knowledge Funnel, and it regularly adopts an ‘action-as-planning’ methodology. We argue that the use of Design Thinking by client-side project managers raises questions as to whether practitioners are ‘project managers,’ or whether they are in fact ‘project designers.’

RESEARCH IMPLICATIONS:

We believe the most significant implication of this research is what our findings might mean in terms of the current theoretical basis of project management. Our research indicates that many of the traditionally accepted theoretical foundations, frameworks and tools may need to be reconsidered. Specifically, our findings indicate Design Thinking may need to be more closely investigated as a theoretical framework for project management.

KEYWORDS:

Project Management; Paradox; Design Thinking; Knowledge Funnel; Action-as-planning; Optioneering

7.5 Introduction

This paper investigates the practice of client-side project management through the lens of paradox theory and focusses on two inherent tensions in the management of Construction projects. These tensions are created by the predictable/unpredictable nature of Construction and the control/flexibility that is required to deliver Construction projects successfully.

These tensions are created by paradoxical forces which can be either latent or salient at various times during a construction project. However, until the project is completed these tensions can never be completely resolved. Our paper uses a grounded theory research methodology to investigate how client-side project managers in the Australian Construction sector manage these paradoxical tensions.

As our findings will show, client-side project managers often demonstrate the characteristics of Design Thinking when managing the tensions created by these paradoxes. This type of thinking simultaneously perceives project work as having both structural and structuring elements; it assumes there are multiple pathways available to resolve issues; it moves through a defined Knowledge Funnel; it regularly adopts an action as planning methodology, and it utilizes a practical tool which we termed 'Optioneering.'

We believe our research has implications for both researchers and practitioners. Our research indicates project management practitioners consciously apply Design Thinking practices in the delivery of their projects. For researchers, this may have implications regarding the theoretical foundations of project management. For practitioners, this may create opportunities for the inclusion of new tools in the delivery of projects. Furthermore, our research has provided practitioners with a tool that they can adopt to help them manage the paradoxical tensions that exist within Construction projects.

7.6 Background and contiguous literature

The following literature review provides a theoretical foundation for our research and associated findings.

7.6.1 Dualities, Dilemmas, Dialectics and Paradoxes

Dualism is a philosophical concept that can be traced back through both Eastern and Western history (Smith and Lewis, 2011, Usher and Whitty, 2017d). However, within the extant literature, there appear to be differing opinions about how dualism should be defined. Putnam et al. (2016) describe dualities as bi-polar relationships that exist within a particular construct; Evans and Doz (1990, 1992) define dualities as opposing forces that must be balanced; while Sutherland and Smith (2011) conceive dualities as interdependent elements that are conceptually different, but not necessarily contradictory or oppositional.

Despite the difficulties that exist in defining dualities most authors agree that dualities have one common attribute. Dualities create tensions, and these tensions must be recognised and acknowledged if they are to be successfully managed.

Janssens and Steyaert (1999) highlight that duality is a general term used to describe all manner of tension-creating elements. It is for this reason that Smith and Lewis (2011) argue for conceptual clarity regarding these different tensions so that the most effective management strategies can be adopted. For this paper, we categorize dualities as either dilemmas, dialectics or paradoxes. Janssens and Steyaert (1999) succinctly express the differences between these categories by stating “....*dilemmas refer to the impossible choice...dialectics stress complementarity...paradoxes emphasize the simultaneous presence of contradictory elements*” (p.122).

Dilemmas exist where there are advantages for each of the elements in the tension-creating relationship, and when these elements are mutually exclusive so that the selection of one element immediately and irrevocably discounts the other from ever being considered again (McGrath, 1981). Dilemmas exist within a specific temporal location (Gaim and Wåhlin, 2016) that is, once a decision has been made at a specific point in time to select one element over the other, the dilemma is successfully resolved, and this specific dilemma will not occur again (Lewis and Smith, 2014).

A dialectic occurs when tension develops between contradictory elements (Smith and Lewis, 2011). The dialectic pattern is the identification of a thesis, followed by the discovery of its

antithesis. The two are eventually resolved through integration and synthesis (Gaim and Wåhlin, 2016, Westenholz, 1993). As Gaim and Wåhlin (2016) note, dialectics always attempt to get rid of the tension that arises from the competing demands. Some dialectics can become paradoxical if the contradictory elements are interrelated, and tension-creating relationship persists over time (Clegg et al., 2002). Smith and Lewis (2011) highlight that dialectic is recognisable as a paradox if the synthesis utilized to resolve the tension becomes unsustainable. If the synthesis is used to 'resolve' a paradoxical tension, the resultant integration will eventually favour one side of the contradiction over the other, thereby causing the same tensions to resurface at another point in time.

A paradox is a term with a long philosophical and rhetorical history and is loosely used by theorist to encapsulate any interesting or thought-provoking tension that does not fit neatly into a well-defined and delimited theory (Poole and Van de Ven, 1989). Even within paradox theory literature, there are wide-ranging definitions of the term. Lewis (2000) notes that the term 'paradox' has been used to describe a range of contradictory, yet interrelated "... *elements, perspectives, feelings, messages, demands, identities, interests or practices...*" (p.76). To further complicate the definition, other authors have removed the need for the elements to be contradictory, and instead use the term paradox to explain counter-intuitive forces or results (Samset and Volden, 2016) or elements that are not oppositional, but are distinct and interdependent (Sutherland and Smith, 2011). Echoing this both Janssens and Steyaert (1999) and Putnam et al. (2016) agree that it is duality, and not a contradiction, that lies at the heart of paradox.

Despite the differences of opinion regarding the need for the elements to be contradictory, there are areas of agreement within the literature. Firstly, there is agreement that the tensions which create paradoxes persist over time (Lewis, 2000, Clegg et al., 2002, Sutherland and Smith, 2011, Gaim and Wåhlin, 2016, Smith and Tracey, 2016). Secondly there is agreement that, as a result of their persistent nature, paradoxes *cannot* be 'resolved' as a dilemma or dialectic, however they can be 'managed' (Janssens and Steyaert, 1999, Achtenhagen and Melin, 2003, Beech et al., 2004, Söderland et al., 2012).

For this paper, we have adapted Lewis's (2000) definition and define paradoxes as persistent tensions that are created by are contradictory yet interrelated elements.

It is important to understand that while the tensions that create paradoxes are persistent, this does not mean they are constant. Tensions created by paradox are inherent within the construct that created them, but this does not mean they are continuously at odds with one another. Poole and Van de Ven (1989) highlight that paradoxes arise within a particular construct when competing demands are situated in the same temporal or spatial locations. Smith and Lewis (2011) echo this by explaining that the tensions that create paradoxes can often lie latent and unnoticed. A paradox only becomes salient when the relational or environmental conditions of the construct force them into contrast. Clegg et al. (2002) perceive the latent/salient nature of paradoxes as a result of the directional flow of the forces between structural poles of the paradox. Where there is a unidirectional flow within the construct towards a dominant element, the paradox will be latent with its tensions not yet developed or manifest. However, when circumstances bring the two poles into contrast, a bi-directional flow is created, and the paradox becomes salient.

7.6.2 Managing Paradoxes

Traditionally, tensions within project work have been addressed using a contingency theory perspective (Smith and Lewis, 2011). As Smith and Lewis (2011) have highlighted, a contingency theory-based perspective approaches any tension by asking “...*under what conditions would A or B be more effective...*?” (p.395). Once this fundamental question is answered, a resolution is achieved by selecting one of the tension-creating elements and discarding the other. The contingency perspective assumes an ‘either/or,’ or an ‘if/then’ approach when confronted with tension-creating forces. Contingency theory-based approaches work well for dilemmas and sometimes dialectics. However, when a paradox is present, it cannot be overcome simply by selecting one element over the other because the two elements are inextricably interrelated. Therefore, when the tension is created by a paradox, a new perspective is required to understand and manage the tension.

Adopting a paradox-based perspective requires the practitioner to approach the tension-creating construct intending to explore how competing demands can be managed simultaneously, rather than looking for a way to resolve the tension (Quinn and Cameron, 1988). Smith and Lewis (2011) argue that approaching persistent tensions with a paradox perspective demonstrates an understanding that multiple divergent demands often require

continuous effort if they to be sustainably managed in the long-term. Unlike a contingency perspective, a paradox perspective assumes a 'both/and,' 'best of both worlds' and even sometimes a 'neither/nor' approach to tension-creating forces (Stroh and Miller, 1994).

Poole and Van de Ven (1989) suggest four possible management strategies when faced with paradoxes, these are:

- (i) Accept and appreciate the contrasting elements as they are;
- (ii) Spatially separate the contrasting elements, so they are not situated near one another;
- (iii) Temporally separate the contrasting elements, so they are not occurring at the same time; and
- (iv) Find a new perspective for viewing the contrasting elements.

Gaim and Wåhlin (2016) have highlighted that these four paradox management strategies fall into the two broader categories of Accepting or Splitting. Beech et al. (2004) note that Spatial and Temporal separation are the most commonly used processes for managing paradoxes as they appeal to our modern, intellectually-structured drive to disentangle problems and create harmony and unity. However, Beech et al. (2004) also advocate resisting the impulse to treat a paradox as a dilemma and attempting to 'resolve' it. Instead, they recommend 'holding the paradox open' and creatively exploring the tension.

The concept of 'holding the paradox open' rather than reducing the complexities of the paradox to an 'either-or' or 'both-and' type resolution is advocated by many of the paradox theorists as a viable paradox-management approach (Stacey et al., 2000, Beech et al., 2004, Gaim and Wåhlin, 2016). Söderland et al. (2012) recommend practitioners facing a paradox forego the immediate gratification associated with resolving the uncertainty created and instead embrace the tensions to develop innovative and creative solutions that might otherwise be overlooked.

In this paper we shall demonstrate how client-side project managers manage paradox by accepting and embracing them. They achieve this by creating both temporal and spatial distance between the paradoxical tensions (Poole and Van de Ven, 1989, Söderland et al., 2012), and, as Clegg et al. (2002) recommend, by holding the opposing poles of the paradox

apart to allow creative solutions to emerge. These approaches require client-side project managers to adopt ‘Janusian thinking’ (Rothenberg, 1980) whereby they deliberately choose to not select one element of the paradox in favour of the other; rather they begin by accepting that both tension-creating elements are simultaneously true and irrevocably interrelated.

‘Holding a paradox open’ creates space for creative solutions to develop (Gaim and Wåhlin, 2016), provokes dynamic interactions (Smith and Tracey, 2016) and resists the temptation for intellectually driven closure (Beech et al., 2004). Holding the poles of the paradox open, creates an opportunity to view the paradox from a new perspective (Clegg et al., 2002, Lewis, 2000, Lewis et al., 2002) through which we are invited to engage with the paradox to find unique emergent options for action, rather than attempting to intellectually ‘solve’ a puzzle (Beech et al., 2004). Perhaps most importantly for this paper, the notion of ‘holding the paradox open’ provides an opportunity for experimental practices and ‘action as planning’ rather than just focussing on the contingency theory based idea of having ‘one best way’ to resolve tensions (Beech et al., 2004, Gabriel, 2002, Winter et al., 2006).

7.6.3 Design Thinking

Martin (2009) has suggested one method for holding the paradox open is to employ ‘Design Thinking.’ Brown (2008) defines Design Thinking as any “...*discipline that uses the designer’s sensibilities and methods to match people’s needs with what is technologically feasible...*” (p.86). Simon (1996) claims that “...*everyone designs who devises a course of action aimed at changing the existing situation into preferred ones...*” (p.111), while Neumeier (2008) states that anyone who attempts to improve a situation employs Design Thinking.

Employing Design Thinking in the midst of paradoxes requires practitioners to balance intuitive and analytical thinking, employ abductive reasoning, be willing to improvise creative solutions by using action as planning, and to work collaboratively to find an acceptable pathway from a range of possible options (Martin, 2009, Clegg et al., 2002).

Design Thinking requires a balance between control and flexibility. Giddens (1984) describes how paradoxes contain both structural and structuring elements. Concerning project work, the

structural element requires the practitioner to ensure the project achieves its purpose by adhering to certain strictures, boundaries, and parameters. However, simultaneously the practitioner must allow for structuring within the course of the project work to respond to emergent conditions in original and unique ways (Clegg et al., 2002).

Martin (2009) explains how Design Thinking moves through a Knowledge Funnel. At the start of the design process, the Funnel is broad and shrouded in mystery. As the designer moves forward, partly by use of specific skills and partly through experience-based intuition, the mystery begins to form into a narrower field of inquiry and discovery. This narrowed scope allows the designer to develop a heuristic understanding of the project. Martin (2009) notes that a heuristic understanding “...represent an incomplete yet distinctly advanced understanding of what was previously a mystery...” and notes that heuristics guides designers towards solutions by providing a means for “...organised exploration of possibilities...”. The final section of the Design Thinking Knowledge Funnel is the construction of algorithms. The move from heuristics to an algorithm requires the designer to discard vast ranges of possibilities and refine the design as a simplified, structuralized and codified a process that anyone with access to the algorithm could enact (Martin, 2009). Our understanding of the Knowledge Funnel is represented in Figure 7-2.

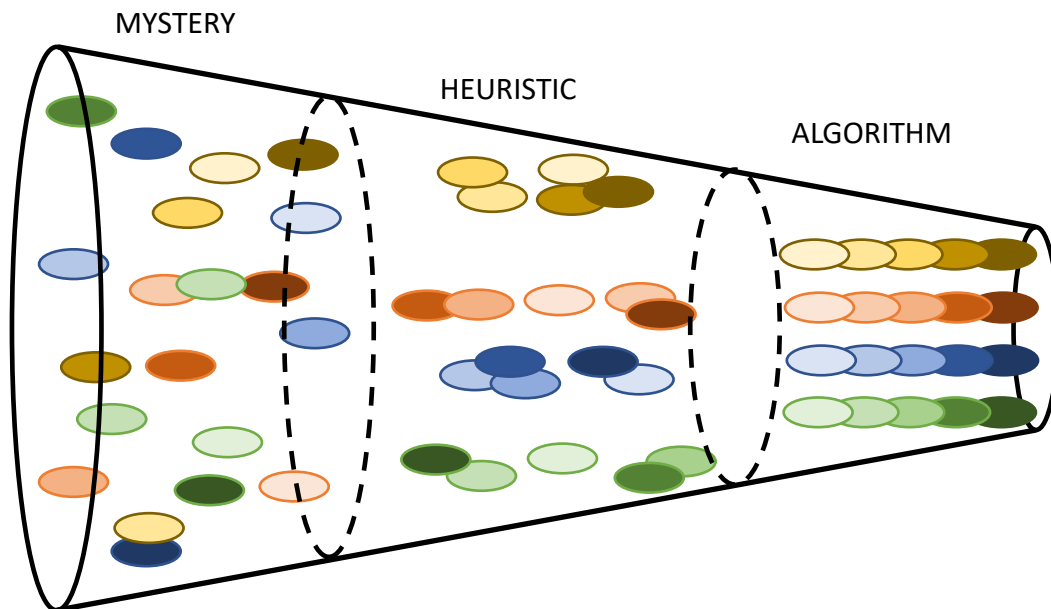


Figure 7-2: The Design Thinking Knowledge Funnel

7.6.4 Project Management Paradoxes

In this paper, we investigate how client-side project managers address two paradoxes that we believe exist when managing project work. For this paper, we have only considered the management of construction projects. However, we believe these paradoxes exist in other project work as well. The paradoxes selected for investigation are:

- (1) The predictable/unpredictable paradox; and
- (2) The control/flexibility paradox.

We will now outline the nature of these paradoxes as they pertain to the discipline of client-side project management, particularly concerning Construction projects.

7.6.4.1 The predictable/unpredictable paradox

Construction is a production system that utilizes a temporary organisation to design and produce physical facilities (Fernandez-Solis, 2013). From one perspective Construction is a deterministic system that allows the outcome of project work to be known in advance with a high degree of certainty. Outwardly the Construction system appears to be governed by rules of linearity, sequentiality, and stability (Gudienė et al., 2013, Usher, 2013, Usher and Whitty, 2017c). It adheres to set processes and procedures that must follow one after the other and can be planned to reduce wastage and increase efficiency.

However, simultaneously within these deterministic parameters, the system behaves in a dynamic, turbulent and often unpredictable manner (Bertelsen and Emmitt, 2005, Bertelsen et al., 2007, Fernandez-Solis, 2013). The Construction process is characterised by iterative feedback loops, emergent forces, fragmented communication, intermediate outcomes which are highly sensitive to the initial conditions of the system, and all the while the system itself regularly creates bifurcation points that render traditional planning methods practically useless (Tsoukas, 1998, Levy, 2000, Fernández-Solís, 2008, Fernández-Solís et al., 2015, Ribeiro et al., 2013).

These dualistic tensions result in a paradox in which the construction system could be described as simultaneously predictable and unpredictable at any given moment in time (Fernández-Solís, 2008, Xiao and Fernandez-Solis, 2016, Koskela and Howell, 2008).

7.6.4.2 The control/freedom paradox

Many authors have noted that project management is a discipline that relies on strong mechanistic controls and detailed planning (Usher and Whitty, 2017c, Baker et al., 2008, Bryson and Bromiley, 1993). The control mechanism and planning processes used by project management practitioners are founded upon certain assumptions that can be traced back to the doctrines of Taylor, Ford and Shewhart (Taylor, 1911, Renault, 2007, Sward, 1968, Deming, 1967, Usher, 2014b). These include the assumptions that project work follows rationalistic and linear sequences (Taylor, 1911, Littler, 1978); that the planner possesses perfect information when developing the initial project plan (Brown and Eisenhardt, 1997, Usher and Whitty, 2017c); and that the project work will be delivered in a stable and controllable environment (Taylor, 1911, Boje and Winsor, 1993).

However, the ‘lived experience’ of the client-side project manager indicates that Construction projects are delivered in dynamic environments in which unexpected events regularly create unforeseen deviations from well thought out, rational and logically developed plans (Dvir and Lechler, 2004, Söderholm, 2008, Terwiesch and Loch, 1999, Usher and Whitty, 2017c). When these unexpected events occur, the predefined plan is often set-at-large for a time, as the client-side project manager responds to the emerging opportunities, threats, risks and information (Aritua et al., 2009, Artto et al., 2008, Lewis et al., 2002).

Therefore, when managing a Construction project work the client-side project manager is required to simultaneously balance the planning and controlling of the project using tried and accepted methodologies and processes, whilst maintaining the flexibility to respond freely to emergent forces and influences (Usher, 2014b).

7.7 Research question

A review of the extant literature demonstrates that construction projects are predictable, inasmuch as the outcome can be known in advance with a high degree of certainty. At a macro level, the Construction system is governed by rules of linearity, sequentially and stability. Concurrently, however, this system progresses using non-linear sequences and contains unexpected and emergent events which can impact the project's outcomes. This means Construction projects can be considered to be both predictable and unpredictable simultaneously. The tension created by these forces will persist throughout the project work, thereby exposing these forces as paradoxical and not dialectic.

In the midst of this paradox, client-side project managers are expected to both plan and control the time, cost, and quality aspects of their projects. To achieve this, client-side project managers utilize systems and methodologies which help them create plans to deliver pre-defined outcomes and control the project within agreed parameters. However, due to the unpredictability inherent in the Construction project work, client-side project managers find themselves requiring a high level of flexibility within these plans to manage unexpected and emergent events. Thus, we see that Construction projects demand that client-side project managers simultaneously provides control over the project while remaining flexible to the dynamic and turbulent delivery environment. This creates paradoxical tension.

Our research explores how client-side project managers attempt to manage these paradoxes by asking:

What strategies do client-side project managers use to manage the predictable/unpredictable and the control/flexibility paradoxes that exist within construction project work?

7.8 Research Methodology

This research was undertaken using a grounded theory methodology. Grounded theory is a qualitative research approach especially suited to developing novel models and theory from social processes (Bryant and Charmaz, 2007, Glaser, 2014). As Wastell (2001) notes grounded

theories arise directly from the data. A grounded theory methodology guides the researchers to discoveries through an interactive process of identifying and selecting the phenomena under investigation; undertaking the data collection; analysing data through concept identification, coding and theming; conducting a wide-ranging literature review to find a construct that can link the identified themes; and finally grounding the research findings within the identified theoretical framework (Wastell, 2001, Locke, 2003, Glaser and Strauss, 1967, Glaser, 2014)

The paradoxes selected for investigation were identified while undertaking data analysis on a separate research project. This separate research project was investigating how client-side project managers handled unexpected events. While undertaking that data analysis, concepts began to emerge that were not specifically associated with the other research project, but which begged new questions about the paradoxical nature of the practice of client-side project management within the Construction industry.

The data was originally collected through semi-structured interviews with a theoretical sample of ten consultant project practitioners, who manage projects in the Australian Construction industry. The sample consisted of a Project Director (10+ industry experience); five Senior Project Managers (5-10 years' experience); and four Project Managers (less than five years' experience). The interview participants were all male. At the time of conducting the interviews, all the research participants were managing project work in the construction sector, with eight of the participants delivering multiple projects concurrently. The participant's clients included four institutions (health and education), six private clients (commercial, data centers, residential and retail), and eight government departments or agencies (Federal and State). Table 7-3 provides a summary of these projects.

Table 7-2: Research participant's current projects extracted from Usher and Whitty (2017c)

Sector	Project Description	Forecast duration	Cost ex GST (AUD)
Federal Government	Project Management of design and construction of hangers, taxiways, airfield lighting, fire-fighting services, General Storage, Specialist storage, multistorey car-parking and office accommodation.	67 months (design to end of Defects Liability Period (DLP))	\$340M
Federal Government	Project Management of design and construction of hangers, taxiways, airfield lighting, fire-fighting services, General Storage, Explosive ordnance storage, roadways bridges and office accommodation.	53 months (design to end of DLP)	\$230M
Federal Government	Project Management of design and construction of hangers, taxiways, airfield lighting, General Storage, workshops and office accommodation	75 months (design to end of DLP)	\$370M
Federal Government	Project Management of construction of warehousing, office accommodation, car-parking, hardstand and enabling infrastructure	18 months (construction to end of DLP)	\$4.2M
Federal Government	Project Management of design and construction Cargo Loading training area, including Warehouse, hardstand, offices, workshops, hardstand and pallet loading facility	31 months (design to end of DLP)	\$82M
Federal Government	Development of Initial Business Case of consolidation of 24 lease-holdings	4 months (no DLP)	\$0.15M
State Government	Project Management of services upgrades including fire, mechanical, and electrical, services and upgrading facility to comply with Disability Discrimination Act requirements.	41 months (design to end of DLP)	\$7.0 M
State Government	Project management of 24 bed demountable geriatric unit in remote central Queensland	22 months (procurement, installation and DLP)	\$2.6M

Institution	Project Management of design and construction for upgrades to existing roadways and increase of landscaping to boulevard	21 months (design to end of DLP)	\$ 4.0M
Institution	Project Management of construction of covered walkways between 6 classrooms	18 months (construction to end of DLP)	\$ 2.25M
Institution	Project Management of design and construction of two storey health clinic including dental surgery facilities	38 months (construction to end of DLP)	\$3.15M
Institution	Project management of design and construction of second storey classroom extension	18 months (design to end of DLP)	\$4.25M
Data Centre	Project management of design and construction of 2N+ production data centre	42 months (design to end of DLP)	\$42M
Retail	Project Management of fitout for restaurant	16 months (construction to end of DLP)	\$2.3M
Residential	Project Management of design and construction of three storey apartments	31 (design to end of DLP)	\$ 4.2M
Residential	Project Management of design and construction of six storey apartments	Project in suspension until Developer secures additional funding	\$20.5M
Residential	Project Management of design and construction of 52 duplex houses, community centre, roadways and associated infrastructure	53 months (design to end of DLP period)	\$52M
Commercial	9000m ² three storey operations centre, including 2N+ data centre	65 months (design to end of DLP)	\$57M

The interviews were digitally recorded before being transcribed into Nvivo for data analysis. The research participants were each given a designator during the interview transcription process (PM01-PM10) to ensure their privacy. The recordings, transcripts and associated data analysis are retained on a password protected computer system.

We commenced the data analysis process for this study by deconstructing the transcripts into ‘thought units’ (Algeo, 2012). These thought units ranged from single words, through to sentences or paragraphs. The thought units were subjected to a process of open coding (Flipp,

2014) from which we identified 17 concepts. Next, we adopted Milliken (2010) ‘substantive coding’ approach and analysed these concepts by looking for commonalities and connections. Through this process, we identified five themes into which the transcript concepts were consolidated.

We then approached the literature to find a theory that might provide a framework for understanding the identified themes and transcript concepts. Through this review, we found Design Thinking theory, which appeared to provide the framework we required. Using this theoretical framework, we undertook a process of axial coding similar to that proposed by Wastell (2001) and re-categorised our themes and transcript concepts into categories that existed within Design Thinking theory. The Design Thinking categories, our themes, and the transcript concepts are provided in Table 7.4

Table 7-3: Concepts and Themes

DESIGN THINKING		
Transcript data concepts	Researcher's themes	Design Thinking category
<ul style="list-style-type: none"> • Fixed Parameters. • Required outcome. • Unforeseen events 	Bounded Freedom	Structural vs. Structuring
<ul style="list-style-type: none"> • No ‘one’ way • Multiple possibilities • Always another path • Designing the path 	Multiple Pathways	Multiple Pathways
<ul style="list-style-type: none"> • Funnel • Narrowing/reducing options • Working from ‘big ideas’ to ‘small’ 	The Funnel	Knowledge Funnel
<ul style="list-style-type: none"> • Improvisation • Changing/adapting • ‘fix it as you go’ • Keep moving forward 	Purposeful Improvisation	Action as planning
<ul style="list-style-type: none"> • Optioneering • Options to challenge thinking 	Optioneering	None identified

7.9 Research Findings

We now discuss our research findings regarding the theme and concepts that were identified through the data analysis.

7.9.1 Existence of paradoxes

To provide a framework for our investigations, we began by reviewing the archival data for evidence of the existence of the predictable/unpredictable and the control/flexibility paradoxes. Fortunately, the original study was investigating how client-side project managers handle unexpected events and had explicitly asked the research participants whether they would classify the project management of Construction projects as a predictable or unpredictable process.

Three of the research participant's (PM01, PM03, PM05) believed project management of Construction projects was a predictable process. Two of the research participants believed the project management of Construction projects was an unpredictable process (PM09, PM10). The other five research participants felt the process was both predictable and unpredictable.

"The whole process is fairly predictable...I mean we know what should happen next, it's just that it doesn't always happen that way and we need to come up with a new way to do things on the fly... so I guess I couldn't say it's one or the other, it's more both..." (PM02)

"...Generalising is fraught with danger, you can't assume that the process is either predictable or unpredictable - it just is what it is, and you need to deal with that..." (PM04)

"...The process is both predictable and unpredictable. I don't know how anyone can just choose one as a description of the process...it's not one or the other, it's both and sometimes at the same time..." (PM06)

“...I'd say it's... both predictable and unpredictable ... but if I had to pick one, I'd say unpredictable. There are parts that are predictable...but it can also be fairly unpredictable...” (PM07)

“...Absolutely there is a predictable part, and there's also the unpredictable and risky part as well...” (PM08)

We found it telling that despite five of the research participants feeling they could definitively classify the project management of Construction projects as either ‘predictable’ or ‘unpredictable,’ their responses were split between these two categories. Based on these responses alone, we would have concluded that the evidence did not support a definitive classification of the project management process. However, it is the responses from the other research participants that provide the most detail in relation to the existence of the predictable/unpredictable paradox. When viewed holistically, the combined responses uncover the existence of the predictable/unpredictable paradox within Construction projects. As PM06 explicitly states “...it's both...at the same time...”.

Another response that we found particularly interesting was the statement by PM04 concerning the existence of this paradox, “...it just is what it is, and you need to deal with that...” this comment appears to indicate an acceptance of the paradox. While none of the other research participant’s explicitly stated acceptance of the paradox, we felt that the fact that the research participants openly discussed the existence of the predictable/unpredictable paradox indicated that this paradox was accepted as inherent within Construction projects.

Next, we approached the transcript data for evidence of the existence of the control/flexibility paradox. Fortunately, the original study asked the research participants “As client-side project manager are you expected to be in control of the project?”.

“...well yes and no. You're expected to have a plan. To understand what needs to be done and how to get there, so in that sense, I guess you could say we are expected to be in control...but as they say, ‘no plan survives the first shot of the battle,’ so it's foolish to try and control that.... You've got to roll with the punches, but just make sure you stay inside the boundaries...”

(PM02)

"...we are certainly expected to be directing and controlling the tasks to make sure it [the project] gets there...the client wants to feel there is a plan, and they want to feel confident that you are in control of that plan...but realistically you can't have control over everything, and you need to accept that... so you need to be flexible and adaptable..." (PM04)

"... I guess it depends on your definition of 'being in control.' There's always Acts of God and stuff we have no control over, but we are expected to control the impacts of those things... but being inflexible is just stupid. You need to recognise that things change and not try to just stick to the program, at some point, you have to say 'things have changed'..." (PM07)

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These research participants describe both "...controlling...", "...being in control..." and the need to be "...flexible and adaptable..." as part of the client-side project manager's role. Although not explicitly stated, we saw within these responses evidence of the control/flexibility paradox, and once again we saw evidence of the research participants acceptance of the paradoxes, "...you can't have control over everything, and you need to accept that..." (PM04).

7.9.2 Design Thinking

7.9.2.1 Structural vs. Structuring

The transcript data presented a process of managing the predictable/unpredictable paradox and the control/flexibility paradox through the use of project management artefacts such as Gantt charts and project management plans to create a structure for delivering the project outcomes.

"...You develop the plan because gives you some form of guidance of what you can do at the start, but as they say 'no plan survives the first shot of battle'... our first step off point in the plan is to head towards this point, and so we head that way...you just head in the right direction...after that, it's more incremental

planning rather than one plan that will see you through the whole project...”
(PM02)

“...The initial planning is very effective, because without initial planning...there is often a hesitancy to commit or do anything. You can only work with the best information you have at any point in time... It will also be bound with the resourcing that we can put forward, and the time allocations that fit the tasks, and so I guess that is the broad structure... the program, the budget, the scope they are the true aiming marks...if you never have a goal, then you won't achieve anything ... if you never had a budget then who knows how much it would cost or will end up costing you...so I think it's important to have a goal, to give you some structure... Your Project Management Plan is an evolving document...the plan may need to change, but you have to start somewhere, and you have to start with the best intentions and what you know at the time, and that needs to be documented...” (PM03)

“....the purpose of the documents [Project Management Plan and Gantt Charts] isn't to tell you where you'll end up but to set a broad trajectory that gives you an aiming point, noting that as you go through the design and delivery process, that isn't necessarily where you'll end up, but what the plan does is allows you to start the journey. Without that initial definition document, you can't start, because you don't know which way you headed really...” (PM07)

“...You need to have clear boundaries of what you want to achieve and how it gets delivered...but its conceptual at the start, and it can change quite radically from inception to completion...and so they [project management plan and Gantt charts] will be provided as a baseline of how the project is intended to go...but you need to be looking at every opportunity and see how you can exploit those opportunities to get the right solution...” (PM08)

The responses indicated the need to develop a structure for delivering the project, as PM08 states “...you need to have clear boundaries of what you want to achieve...”. For the research participants, this appeared to be undertaken through the use of artefacts such as Project Management Plans and Gantt Charts. We found it interesting that the interviewees did not

necessarily consider these artefacts to be the actual plan for what they would eventually deliver, rather they provided a structure from which the final project outcomes would emerge.

These responses indicate both a structural and structuring element to client-side project management. The structuring is in the form of project management artefacts which are intended to instil a sense of confidence that the process was controlled and predictable. The structuring element can be witnessed in the comments where the research participants acknowledge, at least to themselves, that the actual path and plan for the delivery of the project outcomes was yet to develop.

The research participants demonstrate an acceptance that their projects have both a predictable, controllable component, such as the “*boundaries*” mentioned by PM08 and an unpredictable and flexible component because “...*the plans may need to change...*” (PM03).

In these responses, we saw evidence of client-side project managers ‘holding the paradox open’. We felt the development of the project management artefacts was an attempt to temporally separate (Poole and Van de Ven, 1989) the contrasting elements of the paradox. The development of the artefacts instilled confidence in the stakeholders that the project was predictable and controllable, and this gave the research participant's time to allow the next step in the process to emerge thereby placing the structural and the structuring element of the process in different temporal locations.

7.9.2.2 Multiple pathways to required outcome

One of the indicators that Design Thinking is being utilized to manage a paradox is the belief by the practitioners that there is no ‘one set way’ for achieving the desired outcome (Martin, 2009). Design Thinkers tend to delay selection of a specific design solution for as long as possible in the hope that they can develop a creative solution to the tensions being presented. With this in mind, the transcript data were analysed for indications the research participants considered the project outcomes to be achievable in more than one, set way.

“...there is always a number of different ways to achieve their requirements. It's a question of the risks associated with a number of the approaches, or the opportunities, constraints, threats and a whole heap of different inputs that get

involved in the decision-making process. It's a matter of assembling as much of those we can, to best inform options and ultimately then decisions..." (PM04)

"...you're always faced with a number of ways to go... Our job is to navigate that course, to identify the best possible outcome for the client from those that are available..." (PM05)

"...You have to pick a path through the process..." (PM06)

"...you have the best intentions of heading down a certain direction, but then other factors come into plan, and it's not going to work anymore, and you need to go in a different direction...so you have to understand that there are multiple ways to achieve what they are looking for... It's actually more of a thing that needs to be massaged and worked through, and it may require some deviation from where you thought you would go..." (PM08)

The responses indicate that client-side project managers acknowledge the existence of multiple pathways to achieving the desired outcome indicates the possible use of Design Thinking process, by the research participants.

We found the use of terms such as "...assembling..." (PM04), "...identifying the path..." (PM05), "...pick a path..." (PM06) and "...massaging..." (PM08) to be particularly interesting. These terms suggested that client-side project managers are 'designing' the path that the project will take based on certain events. This appears to indicate that not even the research participants could definitively guarantee what path the project would eventually take to reach completion.

We found it interesting that the research participants did not appear to be overly concerned with the impacts that dealing with the paradoxes. Once again we saw evidence that managing paradoxes are an accepted part of the client-side project manager's role and these practitioners simply trusted in their abilities to design a new path to successfully deliver their projects when these paradoxical tensions become salient.

7.9.2.3 Knowledge funnel

Part of our inquiry was to understand how client-side project managers conceptualised the process of moving from the original idea for the project through to the actual final project outcome. We were particularly interested in this because of the interviewee's earlier statements regarding the multiple pathways that were available for achieving the project's outcomes. While reviewing the transcript data, a significant pattern emerged in many of the responses.

"...you keep narrowing down the options until you all know what you are trying to deliver..." (PM05)

"...[the whole process is] like a funnel...the mouth of the funnel and the constraints you have to work in actually ends up in some way defining where you can come out. So as the project manager, in the first instance you need to define how wide the funnel is...then you need to define the sidelines, and from that, you will get a glimpse of the tryline. Where the actual goalposts are is almost unimportant at the start you just need to start running in the right direction, stay within the sidelines, and adjust your run as you get closer to the goalposts...." (PM07)

"...So essentially [you keep] reducing the number of options as you go so you end up with the one you eventually deliver...you've got to narrow your focus...you've got to define the funnel to make sure the project ends up a point inside that funnel that matches what they [stakeholders] are thinking they are getting...that's the real job..." (PM08)

"...You start with the really big, front-end ideas ... you take those ideas and define these down to the next level... you keep going and going until you see the goal. You just keep clearing away options until you see the point that you can zero in on..." (PM10)

These responses either describe or in two instances specifically refer to, a Funnel. This would appear to indicate that client-side project managers follow a similar

pattern to the ‘mystery-heuristic-algorithm Knowledge Funnel’ describe in the Design Thinking literature.

7.9.2.4 Action as planning

One of the interesting concepts arising from the transcript data was the concept of planning and how this occurred when there were multiple possible pathways to deliver a project’s outcome. We were interested in how client-side project managers address the tensions of having to arrive at a set goal when there is no ‘one-set-way’ of achieving this. In analysing the data, we found a pattern within the responses.

“...The statement that helps me with some complex projects is 'fix it as you go.' Plan what you've got, you'll have external influences - you deal with them as you go. Progress as best you can and then reorient and start working through it again as you get the external inputs...” (PM02)

“...Everything in the project is live...and subject to ongoing change...we go down a path. We get to the next fork in the road, two options here. Here is the benefit of each, which way do you want to go? We go that way and get to the next point...you just keep doing that until you eventually arrive at the destination...” (PM03)

“...you have the best intentions of heading down a certain direction, but then other factors come into plan, and it’s not going to work anymore, and you need to go in a different direction... and then it’s a matter of adapting and developing a new plan...the key thing is just to keep everything moving forward all the time...” (PM08)

“...You just keep working through the process, and as you go ...you keep thinking, What's the next step I need to resolve? What can stop that? What can change that? What can impact that? Where am I right now? What are the decision points coming up?...you just sort of plan it as you go...” (PM10)

The concept of *action as planning* is embedded within Design Thinking. It is a technique that is utilized to hold the tensions of a paradox open to discover a creative and original solution. Rather than settling on a plan based on a single path to achieve the required outcomes, Design Thinkers adopt an action as planning approach which allows them enough guidance to reach the next point, but not so much that they become locked into a single pathway to completion. This approach appears to provide predictability and control, while also leaving space for unpredictability and flexibility in planning. The research participants appeared to utilize this technique by only committing to as much of a plan as they needed to keep moving towards the required project outcome.

Terms such as “...*fix it as you go...reorient...*” (PM02), “...*next fork in the road...*” (PM03), “...*What's the next step?...*” (PM10) gives the impression that the future path to achieve a successful project outcome cannot be known in advance in any particular detail. The use of these terms indicates that client-side project managers are actively designing the path forward based on information and opportunities that have a unique temporal location. The next step forward cannot be completely known until they arrive at a particular point in time within that process. When they arrive at that point, the practitioners scan the state of the project work to decide on the options that present a productive way forward.

7.9.2.5 Optioneering

It appears that one of the major roles of a client-side project manager is to move the project forward to a successful outcome. However, we felt this could be particularly difficult to achieve when faced with the predictable/unpredictable paradox, so we analysed the transcript data to look for practical tools that practitioners used to progress their projects towards the required outcomes. The research participant's noted:

“... We move them forward by providing different options for them to consider...” (PM01)

“... There needs to be an element of optioneering ...we should be making sure that every option is reviewed and looked at... we use it [optioneering] to illustrate that another path is available...” (PM03)

“... you don’t necessarily want them [stakeholders] to have a clear idea of the path...sometimes we create options to challenge their thinking and force them to question what they think they already know...” (PM08)

“...there are always multiple options...you give them the options of how they could do what they wanted. Including options that are within their budget and some outside their budget, showing them how much scope they would need to cut to achieve their budget, or how much they would need to find to achieve their desired scope...” (PM09)

The term ‘Optioneering’ utilized by PM03 appeared to encapsulate the process of ‘presenting options’ described by the other interviews. We found the term ‘Optioneering’ particularly interesting because it appeared to convey the nature of paradoxes within the term itself, by synthesising the idea of flexibility and unpredictability (‘option’) with the concept of control and designable predictability (‘-eering’).

Another response that we found particularly interesting was the comment by PM08 in which the research participant indicates client-side project managers might ‘...create options to challenge their thinking and force them to question what they think they already know...’. This appeared to us to be a form of ‘holding the paradox open.’ Rather than allowing the stakeholders to follow the path that they had selected, the client-side project manager forced the predictable/unpredictable paradox open to challenge the previously accepted ‘solution.’

7.10 Discussion

We now discuss our findings concerning the research question.

7.10.1 Design Thinking

Our findings indicate that the tensions created by the predictable/unpredictable and the control/flexibility paradoxes in Construction projects are managed by client-side project managers through the application of specific Design Thinking concepts.

We found that client-side project managers in the Construction industry viewed the project management process as requiring both a structural and a structuring approach. Structure is required to provide guidance in decision making and to promote confidence within the stakeholder groups. The structural component of the project management process provides the predictability and control required for the stakeholders to commit to the project. It also provides the client-side project managers with some surety regarding the project's actual outcome. The structure itself provides the parameters from which the final project outcome will eventually emerge.

Concurrently, the project management process requires an element of flexibility to manage unpredictable events and opportunities that can emerge throughout the process. Interestingly, our findings indicate that creating this flexibility within the project management process may assist client-side project managers by providing time for them to develop unique and innovative pathways to achieving successful project outcomes.

Our research demonstrated that client-side project managers appeared to adopt a Design Thinking perspective regarding the pathways that could be utilised to achieve successful project outcomes. Rather than believing there was one, best way for achieving successful project outcomes, client-side project managers believed there were multiple possible ways for achieving this. We suggest this belief in multiple pathways is fundamental to the concept of structuring. Because client-side project managers believe there was more than one way to successfully achieve the project's goals they were able to act responsively to challenges and unexpected events by 'structuring' or 'designing' a new pathway to the project's end goals. Client-side project managers appear to utilise structuring processes for managing the unpredictable nature of the Construction environment. By accepting that there were multiple ways to achieve a particular outcome within the defined project parameters, the client-side project managers were able to progress the project forward despite uncertainty and ambiguity around the specific details of the pathway. This belief in the multiple pathways appeared to be one way the predictable/unpredictable and control/flexibility paradoxes were managed in the minds of the research participants.

The existence of the Design Thinking Knowledge Funnel was readily apparent in the research data. This led us to consider how a physical Funnel embodies both predictability (the intake, the external walls, and the outlet) and unpredictability (the flow path of the liquid within the

funnel). The idea of a Funnel also embodies both control (the containment of the liquid within the funnel) and flexibility (the liquid particles are free to move anywhere within the Funnel itself). We found the concept of the Funnel, as described by the interviewees, to provide an insight into how client-side project managers held the paradoxes apart. There appeared to be a difference between which elements of the process were predictable and therefore controllable, and which elements of the process were unpredictable and therefore required flexibility.

Our research found that client-side project managers in the Construction industry appear to adopt an *action as planning* methodology for delivering their projects. We found this particularly interesting because it challenges the traditional project management concept of detailed project planning. The use of this methodology is understandable when you consider the interviewees belief that there are multiple pathways available to achieve the required outcome, and that the structuring of the project management process is in response to unique, temporally located events. We felt this delivery methodology was also a process through which the client-side project managers held the paradoxical tensions apart. By only planning as far in advance as they needed to reach the next decision point, the client-side project managers ensured that the paradoxical tensions *did not* become latent. The need to constantly adapt the delivery plan in the face of new information and opportunities, within the overarching project parameters, meant that the tensions within the predictable/unpredictable and the control/flexibility paradoxes remained salient and required a continual process of designing a creative pathway to the next decision point.

7.10.2 Optioneering

Our research indicates that client-side project managers use Optioneering to hold the paradoxical tensions apart. Optioneering, as described in the transcript data, appears to be a process of deliberately delaying the acceptance of a 'solution' to the paradoxical tensions by presenting a range of viable options for discussion and consideration - even when the stakeholders believed a successful resolution had already been found. In other words, Optioneering was utilized by client-side project managers to introduce, or reintroduce, unpredictability into a process that may otherwise have been considered predictable.

The options presented to the stakeholders were controlled by the client-side project manager so that any one of the presented options would move the project towards the required outcome. However, by presenting options, the client-side project manager also created a flexibility in the potential outcomes of the project. We believe that by adopting the Optioneering process, client-side project managers hold the predictable/unpredictable and control/flexibility paradoxes open. In this way, client-side project managers were able to retain predictability and control by presenting options which could achieve required outcomes, while simultaneously creating the flexibility and unpredictability of not knowing which option would be selected by the stakeholders. By utilizing Optioneering, the client-side project managers were able to create time for innovative and creative project pathways to be developed.

We believe the process of Optioneering indicates the existence of the Design Thinking. In deciding which options to put forward for consideration, the client-side project manager must utilize a combination of analytical and intuitive thinking. On the one hand, the client-side project manager must analyse which options they consider viable, based on the current state of the project work. Simultaneously, the client-side project manager must select options which they intuitively believe will result in final project outcomes that falls within the established project parameters.

7.11 Conclusion

This paper investigated how ten client-side project managers addressed the tensions created through the predictable/unpredictable and the control/flexibility paradoxes within Construction projects. By adopting a grounded theory research methodology, we enabled the theme and concepts unpinning our findings to emerge from within the data itself.

Our research demonstrates that client-side project managers hold the predictable/unpredictable and the control/flexibility tensions apart through the use of Design Thinking concepts. Our findings demonstrate that client-side project managers use both structural and structuring processes to deliver Construction projects. We also found that client-side project managers believe there are multiple pathways to achieving project success. We found the existence of a Knowledge Funnel, the use of *action as planning*, and the

application of Optioneering. All of which, reinforce our belief that client-side project managers are adopting Design Thinking practices to manage paradoxical tensions in Construction projects..

However, we acknowledge that research has some limitations and these are outlined below.

7.11.1 Data Collection Limitations

As noted within our paper, the data used in this study was collected as part of the separate study, and therefore the data had certain limitations. Although the data was able to be used in our investigation, we were not able to explore either the themes or the concepts as we would have liked had we been conducting the semi-structured interviews with our particular research question in mind. This limits our research because we could not explore the research participant's response in more detail, we could only work within the data that was previously collected.

7.11.2 Sample Limitations

We believe that the sample used to collect has limitations. Firstly, the sample size is quite small, having only ten participants. While the sample size itself does not reduce the validity of the data collected, we would have liked to have more data to work with.

The other limitation that we see with the sample is the potential for gender bias within the data. The original sample was all male, and we believe this may have an impact on our findings as other genders may approach the paradoxes differently.

7.11.3 Generalisability

As noted above, we believe limitations apply our research, and therefore we would recommend against generalising our findings based on this research alone. However, we did find a certain consistencies within the data, and we believe these should be explored more deeply through additional research to determine if our findings can be applied more broadly.

7.11.4 Implications for research and practice

Despite these limitations, we feel our findings have interesting implications for both project management research and practice.

For project management researchers we believe the most significant implication is what our findings might mean concerning the theoretical foundations of project management - particularly if practitioners are reclassified as “Designers.” We suspect that changing the understanding about what client-side project managers do, might have a significant impact on the theory that they use to support their current practices, process, and frameworks.

Secondly, as a result of the research limitations outlined in this paper, we believe additional research could be conducted using (i) a study specifically designed to address this research question first hand to allow a deeper investigation of the responses; (ii) a larger sample size; and (iii) a more diverse sample size. Furthermore, this research could be conducted in other industries and sectors to investigate if our findings are relevant elsewhere.

For practitioners, our research sheds new light on the ‘lived experience’ of client-side project management. Our findings highlight that the tensions created by two particular project management paradoxes should be embraced. It is by first embracing and then holding these tensions apart, that creative and original solutions to project management challenges can be addressed.

Our research highlights that adopting Design Thinking can assist with holding these tensions apart and create a range of benefits for the client-side project manager. Firstly, by understanding that projects contain both structural and structuring elements practitioners can begin to define more clearly how these interrelate in their projects. Secondly, by understanding that there are multiple pathways available for the successful completion of a project, practitioners can feel free to explore original and innovative solutions when faced with unexpected challenges or seek to exploit opportunities as they arise. Thirdly, by recognising the existence of the project Funnel, practitioners can feel more comfortable in moving their projects forward despite ambiguity or incomplete information. Fourthly, by acknowledging that Construction projects are progressed by adopting an *action as planning*

methodology, practitioners may find themselves less constrained by the strictures of formal, long-term planning.

Our research has also highlighted a practical tool for holding the paradoxical tensions apart. By utilizing the process of Optioneering, client-side project managers may be able to develop ‘time and space’ within their project delivery methodology. This ‘time and space’ can be used to hold open, or in some cases re-open, the tension that exists in the predictable/unpredictable and control/flexibility paradoxes so that new creative pathways to the successful completion of the project can be developed.

8 The client-side project manager: A practitioner of Design Thinking.

8.1 Structure Map

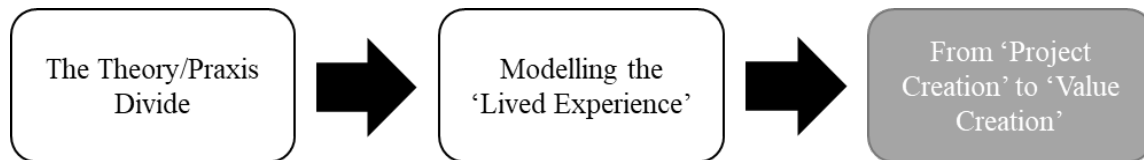


Figure 8-1: Thesis structure map (Chapter 8)

8.2 Preface

This chapter expands on the use of Design Thinking by client-side project managers in the Construction sector that was identified in Chapter 7. This chapter has been accepted by the *Project Management Research and Practice* for publication in their Jan-Jun 2019 release.

The research paper which forms this chapter won the Australian Institute of Project Management (AIPM) Research Paper of the Year (2018) at the Queensland Project Management Achievement Awards (Refer photo on right).



This chapter continues to explore how client-side project managers add value to their projects. Based on my experience as a client-side project manager, I suspected that practitioners were adopting Design Thinking to resolve the challenges that faced when presented with poorly-defined project scopes, or unexpected events that impacted on their existing programs and plans. This chapter investigates whether client-side project managers utilize Design Thinking Mentalities, Thinking Styles, Practices and Tool.

8.3 Key points of this chapter relevant to this thesis

Table 8-1: Key themes of Chapter 8 relevant to this thesis.

- Design Thinking Mentalities, Thinking Styles and Practices.
- The identification of 15 tools that client-side project managers use in the delivery of their projects which align with Tools outlined in the Design Thinking literature.

8.4 Abstract

SYNOPSIS:

Our research adds to the client-side project management body of literature by demonstrating that these professionals display all the characteristics of Design Thinking Mentalities, Thinking Styles and Practices as identified by Hassi and Laakso (2011, p.6) and that they utilize a broad range of the Design Thinking tools identified by Liedtka (2015, p.928) and Johansson-Sköldberg et al. (2013, p. 125) when they deliver construction projects.

RELEVANCE FOR PRACTICE/EDUCATION:

Our findings indicate that client-side project managers should view their role differently to what has been traditionally accepted. The use of Design Thinking within the project management construct highlights that practitioners need to develop skills and tools that address, not just the compliance and control elements of project management, but also information gathering and problem-solving techniques. This change of perspective creates opportunities for project managers to broaden their skill set in order to be able create further value in the Construction process.

RESEARCH DESIGN:

Our research uses a Grounded Theory methodology to explore the ‘lived experience’ of client-side project managers to determine if they utilize Design Thinking when managing Construction projects. This is achieved by creating a framework from the work of Hassi and Laakso (2011, p. 6), Johansson-Sköldberg et al. (2013, p.125) and Liedtka (2015, p. 928) to guide semi-structured interviews with a cohort of ten client-side project managers.

MAIN FINDINGS:

Our research provides evidence of Design Thinking Mentalities, Thinking Styles, Practices and Tools being utilized by client-side project managers when delivering Construction projects. Our findings also identify 15 project management tools used by client-side project managers when delivering Construction projects and highlight that the practice of client-side project management should not be viewed exclusively as part of the ‘Implementation’ process.

RESEARCH IMPLICATIONS:

Our results support existing research on client-side project management and expand the Project Management body of literature by demonstrating how client-side project managers employ Design Thinking to handle poorly-defined projects.

8.5 Introduction

In 2006, the UK’s Engineering and Physical Sciences Research Council commissioned the Rethinking Project Management Network to investigate future avenues for project management research. One of the Network’s findings was the need for project management research to find new ways of conceptualizing the social processes of project management (Winter et al. 2006, p. 639).

At around the same time, researchers began to investigate how Design Thinking could be applied to social constructs outside the traditional design disciplines. This research indicated that the transition from Design science to Management science was possible. However, more empirical investigations were required (Johansson-Sköldberg et al. 2013, p. 128) to overcome a “...*paucity of peer-reviewed articles*...” (Calgren 2013, p. 24).

Our research seeks to address both the need for new conceptualizations regarding the practice of project management, and the need for new empirical research into the applications of Design Thinking. This is achieved by investigating whether client-side project managers utilize Design Thinking when managing Construction projects.

This study utilized a Grounded Theory methodology and conducted semi-structured interviews with a purposive sample of ten practicing client-side project management

consultants who were managing Construction projects. We found the research participants adopted a wide range of Design Thinking Mentalities, Thinking Styles, Practices and Tools.

This study augments and adds to the existing body of literature in a number of ways. Firstly, by reinforcing and expanding Usher and Whitty (2017c, p.10) findings regarding the use of Design Thinking by client-side project managers. Secondly, by demonstrating how client-side project managers have informally adopted Design Thinking to manage Construction projects. Finally, our results provide a foundation for future investigation into the practice of client-side project management.

8.6 Literature Review

The Rethinking Project Management Network project was tasked with “...*enriching and extending the subject of project management beyond its current conceptual foundations...*” (Winter et al. 2006, p.643). One of the findings of the Network was a need for new ways of conceptualizing the social process of project management (Winter et al. 2006, p. 639). Our paper attempts to address this need by investigating the ‘social construct’ of client-side project management through the theoretical lens of Design Thinking.

8.6.1 Client-side Project Management

Existing research on the practice of client-side project management appears to be limited, indicating a pressing need for research into this form of project management. Research on this topic has, thus far, principally been conducted by Walker and Lloyd-Walker (2014), Usher (2014) and Usher and Whitty (2014; 2017a, 2017b; 2017c; 2017d).

Walker and Lloyd-Walker (2014, p. 566) research focussed on the ethical dilemmas faced by client-side project managers. Usher’s (2014, p.13) research challenges the traditional theoretical foundations of client-side project management and finds that the Strategic Management body of theory may provide a better foundation for the practice of client-side project management than Production Management.

Usher and Whitty (2017b, p.598) investigate how client-side project managers deal with unexpected events, and in doing so identify a new change typology called ‘Drift-changes’. Usher and Whitty (2017a, p.5) also explore the relationship that exists between project success and client satisfaction within the project management construct. They find that client-side project managers create value in the Construction process by coupling these two elements together to create ‘Project Management Yinyang’ (Usher & Whitty, p.7). Usher and Whitty (2017d, p. 785) also developed ‘The Final State Convergence Model’. This model conceptualized the non-linearity and complexity that client-side project managers encounter in the Construction process.

Perhaps most important for our research, Usher and Whitty (2017c, p.2) explored how client-side project manager’s deal with paradoxes in the Construction process. In doing, so they identified that client-side project managers appear to adopt some characteristics of Design Thinking. Specifically, that client-side project managers plan multiple pathways for achieving their project’s outcome; they progress through a Knowledge Funnel; and they adopt ‘action-as-planning’ techniques to navigate poorly defined problems. In their findings Usher and Whitty (2017c, p.8) claim that client-side project managers adopt Design Thinking when managing Construction projects. We believe Usher and Whitty’s (2017c, p.8) findings are plausible, but far from conclusive. As such we have decided to investigate their claims more comprehensively.

Ben Mahmoud-Jouini et al. (2016, p.145) highlight that both Design Thinking and Project Management are integrative approaches to problem solving that can enhance organizational outcomes. However, research by Thomas et al. (2002, p.23) found that most senior managers consider the discipline of project management to have little value in terms of problem framing and solving. Morris (2013, p.270) notes that this myopic perspective reduces project management to a compliance and control system which can only be used for delivering projects within predefined constraints, and does not necessarily ensure the integration of project deliverables with strategic benefits.

In recent years, project management researchers have begun challenging the ‘implementation only’ view of project management. They claim that modern project management has evolved to manage the poorly-defined objectives and the environmental uncertainty inherent within Complex, Mega and Wicked projects (Morris 2013, p. 58; McCall & Burge 2016, p.200;

Cicmil et al. 2017, p. 676). Lenfle et al. (2016, p. 385) highlight how these projects are (i) emerging and ambiguous; (ii) often have poorly defined objectives; (iii) need to explore new knowledge areas to achieve the project's goals; and (iv) operate in mixed temporalities which focus concurrently on both short-term and long-term horizons.

Of particular interest to this study is the existing research which shows Construction projects displaying many of the characteristics identified by Lenfle et al. (2016, p. 382). Specifically, that Construction projects (i) can occur in emerging and ambiguous environments (Fernandez-Solis 2013, p. 22; Usher and Whitty 2017b, p. 592); (ii) often have poorly defined objectives due to a lack of uniformly agreed stakeholder expectations (Usher and Whitty 2017d, p. 783); and (iii) need to focus concurrently on short-term horizons when managing unexpected events (Usher and Whitty 2017b, p. 594), and long term horizons to deliver the project's final outcome (Usher 2014, p.12).

8.6.2 Design Thinking

The Design Thinking body of knowledge has developed around the two discourses (Gaim & Wåhlin 2016, p. 34). The Design discourse focusses on the practices of professionally educated designers and the Management discourse focusses on how the same practices are applied to strategy and innovation (Johansson-Sköldberg et al. 2013, p. 127).

Brown (2008, p.86) states that Design Thinking is adopted by anyone who “...*attempts to match people's needs with what is technologically feasible and ...convert [it] into customer value...*”. Cross (2011, p.197) takes this description further by stating that Design Thinking is the ability to resolve ill-defined problems by adopting solution focused cognitive strategies, abductive reasoning and appositional thinking. While (Verganti 2009, p.4) states that practitioners use Design Thinking to “...*make sense out of things...*”.

Adopting a ‘social constructionist’ perspective, Hassi and Laakso (2011, p.6) have described Design Thinking as a framework of Mentalities, Thinking Styles and Practices. Similarly, Liedtka (2015, p. 930) and Johansson-Sköldberg et al. (2013, p. 132) have used this perspective when identifying a range of Design Thinking Tools. Our research also adopts the ‘social constructionist’ perspective.

8.6.2.1 Mentalities

Hassi and Laakso (2011, p.8) define Mentalities as “...*the mental attitude with which problems are approached...*”. They describe the Design Thinking Mentalities as (i) Experimental and Explorative; (ii) Ambiguity Tolerant; (iii) Optimistic; and (iv) Future-Oriented.

An *Experimental and Explorative* mentality is one which is willing to risk failure by pushing capability, technological and organisational boundaries (Fraser 2009, p.64). Design Thinkers tend to see early failures, within acceptable risk levels, as the necessary price for discovering creative and innovative solutions (Brown 2008, p. 87). Fraser (2009, p. 64) notes that approaching problems with this mentality requires a tolerance for failure, blended with personal courage.

Design Thinkers are *Ambiguity Tolerant*. Rylander (2009, p. 11) highlights this is because ambiguity is a natural part of any design process. Boland and Collopy (2004, p. 76) note that Design Thinkers need to be comfortable with ambiguity in order to respond creatively to emergent challenges and opportunities. Being Ambiguity Tolerant provides opportunities for dynamic interactions between seemingly incompatible components (Smith & Lewis 2016, p. 381) and allows Design Thinkers to resist the intellectual temptation for early resolution and closure (Beech et al. 2004, p.1315).

Design Thinkers are *Optimistic*. They assume that every problem has at least one potential solution (Cooper et al. 2009, p. 53). Gloppen (2009, p. 35) highlights this Optimistic outlook means Design Thinkers enjoy finding solutions to problems and provides the disposition necessary to accept and embrace competing constraints. Dunne and Martin (2006, p. 513) argue that these constraints are welcomed by Design Thinkers because they increase both the challenges and the rewards associated with the final resolution.

Design Thinkers are *Future-Oriented*. Simon (1988, p. 67) described Design Thinking as creating a “...*course of action aimed at changing the existing situation into preferred ones...*”. It is this Future-Oriented Mentality that allows Design Thinkers to develop

hypotheses about the future and fuels the vision-driven process of intuition (Martin 2009, Chapter 3, Section: ‘Solving the Paradox at RIM’).

8.6.2.2 Thinking Styles

The second dimension in Hassi and Laakso (2011, p.6) Design Thinking framework is Thinking Styles. Hassi and Laakso (2011, p.8) identified four cognitive activities that Design Thinkers use, these are; (i) Abductive Reasoning; (ii) Reflective Reframing; (iii) Holistic View; and (iv) Integrative Thinking.

Abductive Reasoning allows Design Thinkers to find patterns based on previous practical experience (Lawson 2005, p. 159). Design Thinkers manage vast amounts of information by utilizing a form of logic that blends ‘...*past-data-driven analytical thinking*...’ with ‘...*knowing-without-reasoning*...’ intuition (Martin 2009, p.6). This abductive logic allows Design Thinkers to identify patterns within a morass of seemingly unrelated data.

Reflective Reframing has been described as the ability to see past the ‘immediate’ problem, to ensure that the ‘right’ problem is addressed (Drews 2009, p. 41; Lockwood 2010, p.19). Jordi (2011, p. 183) argues Reflective Reframing is necessary for “*meaning –making*”. For the Design Thinker, the ability to be able to identify, frame, and reframe a problem is crucial in ensuring the most appropriate solution is identified (Beckman & Barry 2007, p. 36).

Design Thinking requires practitioners to be able to take a *Holistic View* of problems (Hassi & Laakso 2011, p.8). Sato et al. (2010, p.51) explain that this Holistic View is necessary to ensure that Design Thinkers understand, not only the functional and technical requirements of the problem, but also social challenges inherent within the problem’s construct. Fraser (2009, p.65) describes this Holistic View as the ability to conceptualize a problem as a “...*living organism rather than as a fixed model*...”. This ability allows Design Thinkers to see potential solutions as interconnected networks between technical, business and human dimensions (Dunne & Martin 2006, p.512; Clark & Smith 2008, p.8; Holloway 2009, p.53).

Design Thinkers utilize *Integrative Thinking*. Brown (2008, p.87) describes this as the ability to see all aspects of the problem in order to create novel solutions. Smith and Lewis (2011, p. 395) argue that Integrative Thinking stands in stark contrast to Contingency Thinking which

asks “...under what conditions would A or B be more effective...”. Instead Integrative Thinking requires a ‘Janusian’ approach (Rothenberg 1971, p. 195) which acknowledges that multiple competing demands can be simultaneously true and irrevocably interrelated.

8.6.2.3 Practices

Hassi and Laakso (2011b, p.6) outline five Practices that indicate Design Thinking is being applied in any problem-solving context. These are: (i) A Human-centered approach; (ii) Thinking-by-doing; (iii) Visualization; (iv) Combining divergent and convergent approaches; and (v) a Collaborative work style.

Plattner et al. (2010, Introduction para 2.) highlight that by adopting a *Human-centered approach* Design Thinkers ensure the resolution of technical difficulties are achieved in such a way as to satisfy the human need from which it first evolved.

The practice of *Thinking-by-doing* is a necessity when dealing with the ‘chance discoveries’ inherent in any form of problem solving (Plattner et al. 2010, Section 5.1). The application of Thinking-by-doing is closely aligned with the concept of the progressive elaboration of a project described in PMBOK guide (2013, p. 74), and Usher and Whitty’s (2017c, p.10) findings that client-side project managers adopt an ‘action-as-planning’ approach when faced with paradox and complexity.

Visualization is central to the Design Thinking process (Eppler & Kernbach 2016, p. 91). Ewenstein and Whyte (2007, p.82) explain that the use of Visualization tools such as pictures, diagrams and boundary objects, allows multi-disciplinary groups to develop creative solutions. Many authors have noted that the Visualization process is vital for discovering and developing the creative solutions that Design Thinking is renowned for (Dorst & Cross 2001, p.434; Stempfle & Badke-Schaub 2002, p.479; Dorst 2011, p. 529).

Drews (2009, p.40) explains that *Divergent Thinking* is required in order to be able to challenge pre-existing assumptions and to create multiple alternatives. Boland and Collopy (2004, Chapter 1, Section: The Decision Attitude) balance this by highlighting the importance of utilizing *Convergent Thinking* to synthesize solutions, create acceptance, and gain the endorsement of a preferred design solution. The concept of combining Divergent and

Convergent thinking is closely aligned to Usher and Whitty's (2017a, p.19) findings regarding the management of success and satisfaction within the Project Management Yinyang framework .

Researchers have noted the need Design Thinkers have for a *Collaborative work style*. Gloppen (2009, p.42) argues that a Collaborative work style is a necessity when facing complex problems as it allows the problem solver to gain new knowledge and perspectives from a range of different disciplines. Boland and Collopy (2004, Chapter 27, Section: Interaction) and Dunne and Martin (2006, p.519) make the interesting observation that Design Thinkers appear to be at their most creative when operating collaboratively.

8.6.2.4 Tools

Liedtka (2015, p.928) outlines a range of tools which Design Thinkers use and explains how these tools are used to develop generate multiple potential solutions. Design Thinkers then prototype and experiment with these to identify the solution that best fits the human, organizational, environmental, and technological constraints of the problem.

Johansson-Sköldberg et al. (2013, p.125) highlight that the real purpose of Design Thinking tools is to create a “...*working hypothesis*...” which allows problem framing, setting, and solution to occur concurrently. These hypotheses allow the Design Thinker to choose “...*which contexts should dominate* ...” (Wylant 2010, p.228). Table 8.2 synthesizes the work of Hassi and Laakso (2011a, p.6), Liedtka (2015, p. 928), and Johansson-Sköldberg et al. (2013, p. 125) to show a relationship between the Design Thinking practices and tools.

Table 8-2: Design Thinking Practices and Tools

Design Thinking Practices (Hassi & Laakso 2011, p6.)	Design Thinking Tools (Johansson-Sköldberg et al. 2013, p.125; Liedtka 2015, p.928)
Human-centered approach	Interviewing, ethnographic studies, observation, focus groups.
Thinking by doing	Journey mapping, hypotheses testing, field experiments.
Visualization	Prototyping, charts, graphs, storytelling, use of metaphor, analogies, ‘whiteboarding’ and sketching to capture ideas.
Combination of divergent and convergent approaches	Sense-making, hypotheses development, challenging assumptions.
Collaborative Work Style	Brainstorming, concept development, combined ideation.

8.7 Research Question

Ben Mahmoud-Jouini et al. (2016, p.145) note that both Project Management and Design Thinking are integrative approaches that attempt to improve organisational outcomes. This comment is interesting when we consider Thomas et al. (2002, p. 23) findings that organisational senior managers considered project management to have little value in problem-framing and solving.

We argue that, as Design Thinking is a problem-solving cognitive activity, any evidence of the utilization of these Mentalities, Thinking Styles, Practices and Tools by client-side project managers would indicate that the discipline has moved beyond simple compliance and control tools. With this in mind, our paper investigates:

Do client-side project managers utilize Design Thinking when managing Construction projects?

8.8 Research Methodology

Our research will explore the ‘lived experience’ of client-side project managers who are managing Construction projects. To do this we adopted a qualitative, ‘Grounded Theory’ methodology. This particular methodology was selected for two reasons.

Firstly, we considered the recommendations of Easterby-Smith et al. (2012, p.49) who argue for the adoption of explorative and qualitative research methods when faced with a research field with limited prior empirical studies. Based on the lack of empirical Design Thinking studies (Calgren 2013, p.24; Johansson-Sköldberg et al. 2013, p.123) and our difficulty in finding peer-reviewed literature on client-side project management, a qualitative research methodology seemed appropriate.

Secondly, we considered the work of Bryant and Charmaz (2007, p.31), Edmondson and McManus (2007, p.1155) and Glaser (2014, p.48). These authors recommend that a ‘Grounded Theory’ methodology is adopted when attempting to generate theory from social processes and ‘lived experiences’.

8.8.1 Research design

Our research investigates the ‘lived experience’ of client-side project managers by creating a framework from Hassi and Laakso (2011a, p.6) Design Thinking Mentalities, Thinking Styles and Practices; and Johansson-Sköldberg et al. (2013, p.125) and Liedtka (2015, p.928) Design Thinking Tools. We used this framework to develop semi-structured interviews. These interviews were conducted with a purposively selected sample of ten client-side project managers within the Australian construction environment. In selecting this sample size we considered the work of Algeo (2012, p.5) who argued that a sample as small as five is sufficient to ensure validity within targeted, qualitative research such as ours.

All of our research participants were male with between three and eighteen years’ experience as client-side project managers in the Australian Construction sector. At the time of conducting the interviews each of the research participants were managing multiple Construction projects. The research participant’s clients included Federal and State government departments and agencies (8 projects); Institutional clients such as education or health (4 projects); and private organisations including Not-for-Profits and private developers (6 projects).

The interviews were digitally recorded before being transcribed into a data analysis program (Nvivo). All of the recordings, transcripts and data analysis are retained on a password

protected computer. The privacy of each research participant is maintained through the application of a re-identifiable code (PM01-PM10) during the transcription process.

The data analysis was conducted by reducing the collected data into ‘thought units’ ranging from sentences to paragraphs using a process similar to that outlined by Ashill et al. (2003, p.437). These thought units were reviewed using Hassi and Laakso (2011a, p.6) Design Thinking framework of Mentalities, Thinking Styles and Practices as the coding categories. Once this was completed a second review of the collected data was undertaken using the Design Thinking Tools framework synthesized from the works of Liedtka (2015, p.928) and Johansson-Sköldberg et al. (2013, p.125) as the coding categories.

8.9 Results

Our results will be presented in the form of abstracts from the research transcripts, using the re-identifiable code for each participant as the citation. Our commentary will be added to provide additional clarity regarding the transcript abstracts.

8.9.1 Design Thinking Mentalities

The data was reviewed looking for evidence of the research participants approaching and addressing problems using the Design Thinking Mentalities identified by Hassi and Laakso (2011, p.6). These are: (i) Experimental and Explorative; (ii) Ambiguity Tolerant; (iii) Optimistic; (iv) Future-Oriented.

8.9.1.1. *Experimental and Explorative*

To test for an *Experimental and Explorative* Mentality, the research participants were asked whether they were able to comprehensively plan their projects with the information they were provided at the commencement of their project. In total seven of the research participants (70%) referred to the projects as being a process of exploration. The research participants explained:

“...Every building is a one-off prototype...you make decisions as you walk down the road...” (PM10)

“... the plan is to head towards where you want to go...you just head off in the right direction... (PM02).

“...[The projects are] always unique. It’s necessary to have the original planning; to have some direction...[but that] initial plan can become almost completed irrelevant...it [the project] becomes something completely different...” (PM08).

“... There is a range of outcomes that could be achieved ...you don’t know at that stage [commencement] what the physical delivery looks like or includes...” (PM09).

The data indicates the research participants thought of their projects as experimental (i.e. “prototypes”) and that the process for successfully delivering the project outcomes required an element of exploration. As PM02 succinctly puts it *“...you just head off in the right direction...”*.

Within the data there were regular references to the research participants adapting their initial plans and an acceptance that the final outcome could be *“...completely different...”* (PM08) to what was first envisaged. The responses indicate a constant reassessment of the likely project outcome. We saw in this evidence that the process that is both Experimental and Explorative.

8.9.1.2. *Ambiguity Tolerant*

To test for *Ambiguity Tolerance* the research participants were asked if they received all the inputs that they needed to plan the project when they commenced the Construction process. All ten of the research participants (100%) indicated their role required them to progress despite gaps in critical project information. The research participant’s told us:

“...we need to have some level of flexibility...you have got to be ready to roll if and when things do change... the only thing you can be sure of is that things will change...” (PM02).

“...there are a series of unknowns and things can change quickly...” (PM04)

“... [Delivering construction projects] can be quite a fluid process, constantly changing and you need to be flexible...there’s always something changing...” (PM08)

“... What you should be doing as a client-side project manager is enabling [the stakeholders] to proceed in the midst of ambiguity...” (PM10)

The data demonstrates that the research participants accept they will need to progress their projects despite incomplete information and a high probability that future information will impact their plans. Interestingly, none of the research participants appeared concerned about this ambiguity. In fact one research participant, PM06, indicated that the challenge created by this ambiguity and uncertainty was part of the attraction for him in making client-side project management his career “... [the ambiguity] is challenging...diverse, fun...that’s what makes it stimulating. No day is the same, that’s for sure...”. PM06’s response reinforces the findings of Dunne and Martin (2006, p.513) who proposed that the challenges created by poorly defined problems are often welcomed by Design Thinkers because they add to the sense of satisfaction felt once a successful solution is identified.

8.9.1.3 Optimistic

To test for an *Optimistic* Mentality, the research participants were asked how they felt about having to manage their projects in the midst of incomplete information, ambiguity and uncertainty. The research participants explained:

“...you can only try your best to get where they [stakeholders] want to be...you just have to go for it...” (PM02).

“...you have to have a positive outlook... [and] stay in an optimistic frame of mind...” (PM09)

“...[Ambiguity is a risk] to people who look at things as a threat, whereas...you need to be looking at them as an opportunity to see how you can exploit opportunities to get the right solution...[our role is to make stakeholder’s see] the impossible that can be possible...” (PM10)

The data indicates the research participants approach the challenges associated with ambiguity with a positive mindset; confident in their own abilities to manage whatever might occur throughout the construction process. We saw this as evidence of an *Optimistic Mentality*.

8.9.1.4 Future-Oriented

To test for a *Future-Oriented* Mentality the research participants were asked how they managed risks. Their responses demonstrate an ability to look beyond the present and focus on the project’s future outcomes. This *Future-Oriented* perspective allowed them to ‘foresee’ how present-day decisions would impact on their projects.

“... [client-side project managers] have a role to keep the project moving forward...we start to sideline unfeasible options reasonable quickly... You need to advise them [Sponsors and stakeholders] on what the likely outcome is going to be of whatever issue they are facing...” (PM03)

“...you are continually looking at what’s lying ahead...looking forward and then discussing that with them [Sponsor and stakeholders] and then working out a plan together ...” (PM09)

“...you just have to keep everything moving forward...so you need to know what you need from them in advance ...” (PM10)

The phraseology utilized by the research participants was interesting. Comments such as “...moving forward...” (PM03, PM07 & PM10) and “...looking forward...” (PM09) all

indicate a *Future-Oriented* Mentality. The data appears to indicate that the research participants were a group who are not content with ‘what is’, but prefer to keep their focus on ‘what could be’.

8.9.2 Thinking Styles

Hassi and Laakso (2011, p.6) identified four Thinking Styles that Design Thinkers adopt. These are (i) Abductive Reasoning; (ii) Reflective Reframing; (iii) Holistic View; and (iv) Integrative Thinking.

The data was analyzed for evidence that demonstrated the research participants were utilizing these Thinking Styles.

8.9.2.1 Abductive Reasoning

To test for *Abductive Reasoning* we looked for evidence that the research participants were using a combination of experience and intuition to manage poorly defined problems. We asked the research participants how they managed their projects when faced with incomplete information.

“...some of it is intuition, some of it is experience based...” (PM02)

“... I think it’s something you learn from going through projects... I think its experience in the field that helps you know which way to go...” (PM06).

“... I make recommendations [to the Sponsor and stakeholders]... that’s part of our experience in assessing the details... [being able to] advise if there are implications to decisions that are made or changes and [knowing] how that can impact the project strategically...” (PM09)

The data indicated that the research participants were utilizing a combination of intuition (PM02) and experience (PM06 & PM09). The use of both intuition and experience is a hallmark of Abductive Reasoning.

8.9.2.2 Reflective Reframing

To test for *Reflective Reframing* the research participants were asked how they filled the information gaps in their projects. The research participants told us:

“... [a lot of the questions I ask are] ...testing my assumptions as a client-side project manager...” (PM02).

“... the most fundamental thing I found in project management is being able to ask the right question and to style the questions... [to] get them to define what they want to achieved, not how they want it to look...” (PM04).

“... [we say] this is how we understand your words and your comments, can you please confirm this...” (PM06).

“... what you need to do is to frame the argument; all the decision, all the information, in a certain way that...empowers them [Sponsor and stakeholders] to make the decisions...” (PM10).

The data demonstrated a pattern of gathering information, reframing it to highlight the gaps in the information, and then articulating and documenting this information in such a way so that stakeholders could either fill in the gaps or endorse the research participant’s understanding. We saw these responses as evidence of *Reflective Reframing*.

8.9.2.3 Holistic View

To test for a *Holistic View* the research participants were asked how they perceived their role in the Construction process. The research respondents explained:

“... [a client-side project manager must have] oversight and understanding of the strategy, finances...all of the works, and the staff... of the wider political issues...the client-side project manager must be across the business... cost, time, facility benefit... and then marry this back to the original project benefit...” (PM03).

“...The client-side project manager generally provides a more strategic oversight because they’re looking beyond just building [the facility]. They’re looking at through-life support, maintenance and the broader factors...”
(PM04).

“... [the client-side project manager must be] mindful of their decisions on the business side of things...to keep the project within the macro-positioning ...”
(PM10)

The responses indicated that the research participants perceived their role from a *Holistic View*. They were not just concerned with the successful delivery of a facility but felt obligated to understand and provide direction on how the project’s outcomes would achieve the Sponsoring organisation’s strategic goals.

8.9.2.4 Integrative Thinking

To test for *Integrative Thinking* the research participants were asked whether they felt the elements of the Construction process were an interrelated system or discrete elements.

“... [you have] the users, the client, the contractor... [we need to] be seen trying to balance everybody...” (PM01)

“... Stakeholders will have different requirements, quite often they will need to be balanced...”(PM02)

“... [all the project elements] are interrelated and they can have knock-on effects...” (PM05).

“...certainly a lot ... are related to other aspects and it’s not just an isolated outcome...” (PM09).

“... [the client side project manager] is the central cog...when you think that you could have a thousand people, some on the other side of the world, who buy-

in to this delivery... there is actually cogs connected to cogs...my job is to keep all the other cogs moving, and moving together...” (PM10).

The data indicates that the research participants viewed the Construction process as a series of interconnected elements and decisions. Comments such as “...*balancing*...” (PM01 & PM02) indicate the research participants saw an interconnectedness in the divergent perspectives of the project stakeholders. PM10’s comments regarding the client-side project manager being the central “...*cog*...” provides a clear mental image of *Integrative Thinking*.

8.9.3 Practices

Design Thinking is a cognitive strategy utilized to solve poorly defined problems. In order to identify and develop creative solutions, Design Thinkers adopt certain practices. Hassi and Laakso (2011, p.6) identified five Practices adopted by Design Thinkers, these are; (i) A Human-centered approach; (ii) Thinking-by-doing; (iii) Visualization; (iv) Combining divergent and convergent approaches; and (v) A Collaborative work style.

8.9.3.1 Human-Centred Approach

To test for a *Human-Centered Approach*, we asked the research participants what they considered was their main role in the Construction process. We anticipated the data would show a strong bias towards technical and contractual elements. However, the data revealed some surprising responses.

“...my role is all about People Management. It’s an influencing role...” (PM01)

“...it’s expectation management, that’s what it comes down too...” (PM02).

“...project management is about facilitation and that’s all about communication. If everyone knows what’s going on, if everyone knows what they need to know...everything is a lot smoother...” (PM06)

“...the role needs negotiation skills...regular meetings...explaining...communicating...trying to get everyone on the same page...so it’s very much those people skills...” (PM09).

Interestingly, the data indicates a strong bias towards a *Human-Centered Approach* to the Construction process by the research participants. They explained how “...*People Management...*” (PM01), “...*expectation management ...*” (PM02) and “...*people skills...*” (PM09) play a central role in the client-side project management of Construction projects. We saw this as evidence that a *Human-Centered Approach* was being adopted.

8.9.3.2 Thinking-by-doing

To test for *Thinking-by-doing* the research participants were asked how they managed to move their projects forward in light of information gaps. The research participants explained:

“...the statement that helps me with some complex projects is ‘fix it as you go’. Plan what you’ve got...progress as best you can at the start and then reorient and start working through it again...” (PM02)

“...You develop a plan of how you intend to do the project...and then it’s a matter of adapting that plan and updating the plan, keeping everybody informed...” (PM09)

“...you make decisions as you walk down the road...so you just sort of plan it as you go...” (PM10)

The data clearly demonstrates the research participants adopting a *Thinking – by - doing* approach. This supports the findings of Usher and Whitty (2017c, p.10) regarding client-side project manager’s bias towards an ‘action-as-planning’ approach to managing paradoxes in Construction projects.

8.9.3.3 Visualisation

To test for the practice of *Visualisation* the research participants were asked what tools they used to explain complex issues to their Sponsor and stakeholders.

“...I do love a really good diagrammatical representation...” (PM02)

“...I used a Gantt chart to illustrate that another path was necessary, it didn't create the path. That was created after...” (PM03).

“...Time will be a form of graphical program showing all the various stages and the breakdown of those stages – what depends on what elements and how the critical path flows...” (PM09).

“...the budget document, preparation of a time-based program. Just to show visually how we got through things...” (PM10)

The research participants indicated that they regularly use *Visualization* tools to explore the potential project pathways, to explain the interconnectedness of activities, and to demonstrate the flow-on effects of particular decisions.

8.9.3.4 Combining divergent and convergent approaches

To test for the practice of *Divergent and Convergent Approaches* the research participants were asked a range of questions about how they validated assumptions and how they managed disparate Stakeholder expectations. The participants told us:

Adopting a divergent approach:

When discussing a review of a business case at the commencement of a project

“...I presented the case to the steering committee... [and asked] do you really need this [facility] ? What is the benefit?...” (PM03)

“... you need to generate a bit of conflict in the organization to find the real need, which is based on a series of assumptions, facts and constraints...”
(PM04)

When discussing whether stakeholders have a unified vision of the project outcome PM07 noted, *“...they think they know what they want...but that’s often created by strong personalities with a particular preference...[I have to] interrogate that by questioning in detail what they think they want...start to chip away...[then I find] there are a lot of questions that haven’t been considered...”*

Adopting a convergent approach

“... [I build consensus] by allowing them [Sponsor and stakeholders] to revalidate their decisions and assumptions...” (PM06)

“...they all have a slightly blinkered view...but the client-side project manager has to integrate these blinkered views with the next person’s...” (PM10)

These responses indicated both *Divergent and Convergent Approaches* being adopted by the research participants. The Divergent Approach was used to challenge preconceived ideas, biases and group-think in order to interrogate the issues, drivers, requirements and constraints of the project. The Convergent Approach was used to bring disparate perceptions together in order to unify understanding of the project’s requirements and manage the stakeholder’s expectations regarding the projects outcomes.

8.9.3.5 Collaborative work style

To test for a *Collaborative Work Style*, the research participants were asked: (a) How they gathered information at the commencement of the project scoping process; (b) How they managed challenges throughout the Construction process; and (c) How they aligned disparate Sponsor and stakeholder expectations. The respondents told us:

“...a good project manager will be flexible...and adaptable and be willing to listen...and get advice on what could and should be done...[to make sure] all the players are involved...” (PM04)

“...[delivering any project is about] ...a group of people, teaming up towards the delivery of the same facility...that means consulting with them...” (PM06)

“...there is a lot of consultation and collaboration...[to] ensure they [Sponsor and stakeholders] retain ownership...” (PM09)

“...there is always a lot of collective knowledge that should be used to make decisions...” (PM10)

The responses demonstrate the research participants adopting a *Collaborative Working Style*. The research participants described themselves as being part of a team with a common goal (PM06) which requires “...consulting and collaboration...” (PM09) to achieve a successful outcome. PM10 seems to summarise the comments of the other research participants when talking about the “...collective knowledge...” that needs to be accessed in order to make decisions during the project.

8.9.4 Tools

The data was reviewed searching for any indication that the research participants were adopting Design Thinking tools. Our analysis identified 15 different tools that the research participants used during the Construction process. The tools are listed in Table 8-3.

Table 8-3: Tools research participants used during the Construction process

			Research Participant									
#	Client-side Project Management Tool	Abbreviation	1	2	3	4	5	6	7	8	9	10
1	User Requirements Brief	URB	✓	✓		✓		✓	✓	✓	✓	✓
2	Functional Design Brief	FDB	✓	✓		✓	✓	✓	✓	✓	✓	
3	Workshops	Wsh	✓	✓						✓	✓	✓
4	Interviews/Consultation	I/Con	✓								✓	✓
5	Feasibility Studies/Business Case	FS/BC	✓		✓	✓				✓	✓	
6	Options Analysis	OA	✓		✓	✓				✓	✓	
7	Contracts	Con					✓				✓	
8	Value Management Workshops	VM					✓		✓			
9	Monthly Reports	MR			✓					✓		
10	Gateways/Hold Points	Gate	✓		✓		✓	✓	✓	✓	✓	
11	Risk Analysis	RA			✓				✓	✓	✓	✓
12	Communication	Comm										
13	Cost Plan/Budget	Bud		✓	✓		✓	✓	✓	✓	✓	✓
14	Program	Pro	✓	✓	✓		✓	✓	✓	✓	✓	✓
15	Project Management Plan	PMP			✓	✓	✓	✓			✓	✓

The identified client-side project management tools were reviewed against the Design Thinking tools already documented by Liedtka (2015, p.928) and Johansson-Sköldberg et al. (2013, p. 125). This review interrogated the data looking at how the research participants described the way they used the client-side project management tools and assessed whether these aligned with the identified Design Thinking tools. Table 8-4 demonstrates how each of the identified tools aligns with the Design Thinking tools identified by Liedtka (2015, p.928) and Johansson-Sköldberg et al. (2013, p.125).

Table 8-4: Design Thinking Tools vs. Client-Side Construction Project Management Tools

#	Client-side Project Management Tools															Count
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Design Management Tools	URB	FDB	Wsh	I/ Con	FS/ BC	OA	Con	VM	MR	Gate	RA	Comm	Bud	Pro	PMP	
Interviewing	✓			✓							✓	✓		✓	✓	6
Ethnographic Studies	✓	✓		✓				✓				✓		✓	✓	7
Observations	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	11
Focus Groups			✓	✓		✓		✓		✓	✓	✓			✓	8
Journey Mapping	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	12
Hypothesis Testing		✓	✓		✓	✓		✓	✓			✓	✓	✓	✓	10
Field Experiments			✓			✓		✓	✓			✓	✓	✓		7
Prototyping		✓	✓		✓	✓		✓	✓	✓		✓		✓	✓	10
Charts			✓		✓	✓			✓		✓	✓	✓	✓	✓	9
Graphs		✓	✓		✓	✓			✓		✓	✓	✓		✓	9
Story telling	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	13
Metaphor				✓												1
Analogies				✓												1
White-boarding			✓			✓					✓	✓				4
Sketching			✓			✓						✓		✓		4
Sense-making	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	14
Hypothesis development	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓		✓	✓	12
Challenging assumptions	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	14
Brainstorming	✓		✓			✓		✓			✓	✓				6
Concept development	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	13
Combined Ideation	✓		✓			✓		✓			✓	✓		✓		7

As Table 8-4 demonstrates, the Design Thinking tools used most regularly by the research participants were ‘Sense-making’ (14), ‘Challenging assumptions’(14); ‘Story telling’ (13), and ‘Journey mapping’ (12). Interestingly, Contracts (‘Con’) did not correlate to any of the Design Thinking tools outlined by either Liedtka (2015, p. 928) or Johansson-Sköldberg et al. (2013, p.125). We suspect this is because Contracts prescribe what is expected, what is monitored, how progress will be assessed and how parties are required to behave. Hence, Contracts are not ‘problem-solving’ tools they are compliance and control tools.

8.10 Discussion

We will now discuss the results of this research with reference to the Research Question and how these results contribute to the literature.

8.10.1 Design Thinking in Project Management

Our research posed the question: Do client-side project managers utilize Design Thinking when managing Construction projects? This research adopted Hassi and Laakso (2011, p.6) Design Thinking frameworks as our method of analysis. Their framework has three dimensions; (i) Design Thinking Mentalities; (ii) Design Thinking Thinking Styles; and (iii) Design Thinking Practices. In addition, our research also investigated whether client-side project managers in the Construction sector utilize the Design Thinking tools outlined by Liedtka (2015, p.928) and Johansson-Sköldberg et al. (2013, p.125).

8.10.1.1 Design Thinking Mentalities

The results indicate that the client-side project managers involved in this research adopted all four of the Design Thinking Mentalities outlined by Hassi and Laakso (2011, p.6). The research participants demonstrated an *Experimental and Explorative* Mentality in the way they approached their projects as one-off prototypes. They progressed their projects despite understanding the project's outcome might be considerably different from the one that was originally envisaged by themselves, the Sponsor, and the stakeholders.

In progressing their projects forward, the research participants proved to be decidedly *Ambiguity Tolerant*. All the research participants indicated they could progress their projects despite the ambiguity created by gaps in critical project information.

The data indicated that client-side project managers are *Optimistic*. They were confident in their ability to manage all aspects their projects to a successful outcome. This was in spite of having to contend with incomplete information and in the understanding that unexpected challenges could impact their ability to successfully deliver the project.

Finally, client-side project managers appear to have a strong *Future-Oriented* Mentality. When faced with information gaps, unforeseen challenges, and in the knowledge that unexpected events may hinder their progress, they overcome obstacles by focusing on the future outcomes to be achieved, not the difficulty immediately in front of them.

8.10.1.2 *Design Thinking Thinking Styles*

Our findings indicate that client-side project managers utilize all of the Thinking Styles outlined in Hassi and Laakso's (2011, p.6) Design Thinking framework. The research participants indicated they draw on both intuition and experience when planning the progress of their projects, recommending options, or determining the potential impact of risks. This indicates the application of *Abductive Reasoning*.

The research participants spoke of using *Reflective Reframing* to help them understand the Sponsor's and stakeholder's expectations. They also utilized Reflective Reframing when attempting to understand the Sponsoring organisation's drivers, or to test and validate assumptions upon which key decisions had been made.

The research participants took a *Holistic View* with respect to their role on projects. They described how they saw their projects in strategic terms. They felt responsible, not just for the construction of a facility, but for understanding how this facility would operate throughout the whole of its life and how it would fulfill the broader objectives and drivers of the Sponsoring organization.

Finally, the research participants saw themselves as part of a much bigger process. They described their role as balancing the strategic needs of the business with the project outcomes and the Sponsor and stakeholder's expectations. They demonstrated *Integrative Thinking* when consolidating disparate expectations of the project Sponsor, stakeholder and project teams together to create unified vision of the project outcomes.

8.10.1.3 *Design Thinking Practices*

The findings of this research demonstrate the research participants adopted all five of the Design Thinking Practices outlined in Hassi and Laakso's (2011, p.6) framework.

Despite our assumptions to the contrary, the research participants exhibited a highly *Human-Centered Approach* to managing their Construction projects. They repeatedly described their role as 'people management' and spoke of how they need to manage the fears, concerns and expectations of the Sponsor and stakeholders.

The research participants showed a strong bias towards *Thinking-by-doing* as the tool for managing complex or poorly-defined project scope and risks. They appeared to treat their programming (i.e. Gantt Charts) as hypotheses to be tested rather than formal plans to be adhered to. The research participants regularly mentioned changing their programs and plans as new information came to light or as unforeseen events impacted on their proposed project plans.

Visualisation was regularly used by the research participants in order to communicate with their Sponsors and stakeholders. The data highlighted how the research participants would use project management artefacts such as Gantt charts and reports to help tell the story of the project, to help the Sponsor and stakeholders make sense of the project and its environment, and to create confidence that the project outcomes were achievable.

The data indicated that the research participants combined *Divergent and Convergent approaches* to progress their projects. At different times throughout the Construction process, the research participants would alternatively “...*generate conflict*...” (PM04) in order to identify or challenge pre-existing assumptions and bias; or “...*integrate*...” (PM10) differing opinions in order to create a consensus and gain a unified endorsement to progress.

Finally, the data demonstrated that the research participants adopted a *Collaborative Work Style* to access the “...*collective knowledge*...” (PM10) that resides within the Sponsor, stakeholders and project team.

8.10.1.4 *Design Thinking Tools*

Our research identified 15 specific client-side project management tools that the research participants utilized to manage their Construction projects. With the exception of ‘*Contract*’ these project management tools were able to be categorized according to the Design Thinking tools previously identified by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p.125). Based on the data, we surmised that the *Contracts* are not utilized as a problem-solving tool, but instead are a tool developed for monitoring and controlling the project.

8.10.2 Client-side Project Management

The results of this study augments and expands the limited body of literature regarding client-side project management. Our research has augmented the existing literature by providing support to Usher and Whitty (2017c, p.10) claims that client-side project managers may utilize Design Thinking, and that these practitioner's adopt an 'action-as-planning' approach in Construction projects.

Our research has added to the body of literature by demonstrating that client-side project managers display all the characteristics of Design Thinking Mentalities, Thinking Styles and Practices as identified by Hassi and Laakso (2011, p.6) and that they utilize a broad range of the Design Thinking tools identified by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125). The contribution our research has made to the client-side project management literature is summarized in Table 8-5.

Table 8-5: The contribution of this study to client-side project management literature

Key point	Supported	Added
Utilization of Design Thinking (Usher and Whitty 2017c, p.11).	*	
Utilization of 'Action-as-planning' techniques in Construction projects (Usher and Whitty 2017c, p10).	*	
Adoption of Design Thinking Mentalities		*
Adoption of Design Thinking Thinking Styles		*
Adoption of Design Thinking Practices		*
Utilization of Design Thinking Tools		*

8.11 Conclusions

Our research finds that client-side project managers utilise Design Thinking when delivering Construction projects. Our research provides clear evidence of all of Hassi and Laakso's (2011, p.6) Design Thinking Mentalities, Thinking Styles and Practices being utilized by client-side project managers when delivering Construction projects. Furthermore our research found a strong correlation between Liedtka's (2015, p.928) and Johansson-Sköldberg et al. (2013, p.125) Design Thinking tools and the tools utilised by these practitioners. Combined,

these findings strongly indicate that Design Thinking is being utilised by client-side project managers when they are delivering Construction projects.

Our findings highlight that the practice of client-side project management should not be viewed exclusively as part of the 'Implementation' process. As such, our research shows that client-side project management has more to offer in the Construction process than simply the delivery of compliance and control systems.

8.11.1 Limitations of this research

The main limitation we identified in our research is the generalizability of our findings. Our research was conducted in a specific social construct with a small group of research participants. Although the sample size does not affect the validity of the research findings, we concede that it may impact on the generalizability of the results. This could be overcome by conducting future research with a larger sample size.

We also note that our research was conducted with a group of consultant client-side project managers. We believe the findings of this research could be enhanced by undertaking similar research with a more diverse range of Construction sector project managers.

8.11.2 Implications for research and practice

Our study has implications for project management research. Our research demonstrates a clear link between Design Thinking theory and Project Management theory, and has provided some empirical evidence into the use of Design Thinking in a project management construct. However, more research still needs to be conducted, particularly into how Design Thinking Mentalities, Thinking Styles, Practices and Tools are applied within different project management constructs.

The findings of this research has implications for the practice of project management. Our research indicates that project managers should view their role differently to what has been traditionally accepted. Design Thinking is first and foremost, a problem-solving activity. The use of Design Thinking within the project management construct highlights that practitioners

need to develop skills and tools that address, not just the compliance and control elements of project management, but also information gathering and problem solving techniques. This change of perspective creates opportunities for project managers to broaden their skill set in order to be able create further value in the Construction process.

9 Creating Value through Client-side Project Management

9.1 Structure Map

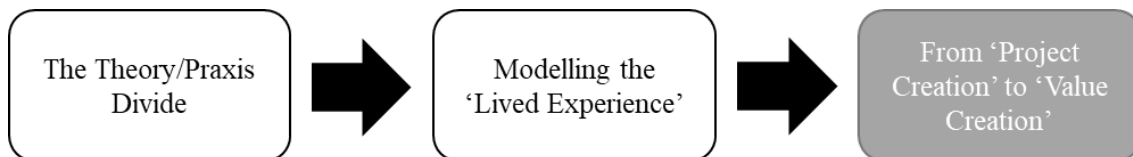


Figure 9-1: Thesis structure map (Chapter 9)

9.2 Preface

This chapter presents an empirical paper which has been submitted to the *International Journal of Managing Projects in Business* and is currently under review. This chapter continues the investigation into the role that client-side project managers have in creating value in their projects.

In this chapter I explore value creation as a function of a value network, rather than a value-chain. This paper focuses specifically how client-side project managers create value through these networks. This perspective highlights how the positivistic and interpretivist element of the project management *Construct* (Chapter 4,5 & 6) operate concurrently. This paper shows how value networks must deliver both *Functionality* (Positivist assessment) and *Representations of Value* (Interpretivist assessment) in order to deliver value. This paper also addresses one area of further development outlined in the findings of my Final State Convergence Model (Chapter 6) which is to explore the “...value that the project manager provides in the transition process....”(p.177)

This chapter extends my previous research into the role of Design Thinking (Chapters 7 & 8) in the practice of client-side project management. My research in this chapter discovers the ‘Nested Project Management Knowledge Funnel’ and its associated ‘Confidence Locks’. These discoveries provide new understanding of how client-side project managers create value.

9.3 Key points of this chapter relevant to this thesis

Table 9-1: Key themes of Chapter 9 relevant to this thesis

- Client-side project managers create value by managing complex networks.
- Client-side project managers act as System Specialists to develop the Construct, Controls and Confidence required to create value in highly complex networks.
- Client-side project managers create value by adopting the Nested Project Management Knowledge Funnel framework.
- Confidence Locks exist within the Nested Project Management Funnel and client-side project managers must acquire the confidence of decision makers so that these locks can be released and the project can progress to the next stage of the Nested Project Management Knowledge Funnel.

9.4 Abstract

Purpose:

This paper investigates the role client-side project manager's play in creating value. It investigates whether client-side project managers fulfil the role of System Specialists and whether they use a Knowledge Funnel framework to guide the development of value creation networks.

Design/Methodology:

This research uses a Grounded Theory methodology. Data were collected through semi-structured interviews with a sample of ten client-side project managers. Data analysis was conducted by reviewing 'thought units' against themes extracted from within the project management and value creation literature.

Findings:

Based on our research we found that client-side project managers fulfil the role of System Specialists by developing the Network Construct and Network Controls necessary to value networks. We also found that client-side project managers use a Knowledge Funnel

framework to guide the development of value creation networks and that these Knowledge Funnels contained Confidence Locks which the client-side project manager must release if they are to move through the Knowledge Funnel.

Research Implications:

Our findings provide new avenues for research into value creation through project management. In addition, our discovery of the Nested Project Management Knowledge Funnel and Confidence Locks opens avenues for further research.

Practical Implications:

Our findings demonstrate that client-side project managers require competencies in Visioning/Sense-making and Agenda Framing in order to manage value networks. Our discovery of the Nested Project Management Knowledge Funnel and Confidence Locks provides new insights into how practitioners can create value.

Originality/Value:

Our research adds to project management value creation literature by investigating the ‘lived experience’ of client-side project managers through a value network lens.

Keywords:

Client-side project management; Value creation; Networks.

9.5 Introduction

Client-side project management is a form of project management which focuses on protecting the client's interests in a project, rather than a contractor's or consultant's interests (Helal, 2017). Godbold (2016) highlights that relatively little empirical research has been conducted into the role of client-side project management and argues that this has left the profession to "...*fit into the literature as best it can...*" (para 2). As Godbold (2016) notes, this lack of scholarly focus means client-side project management is rich with research opportunities to address the "... *lack of clarity about the competencies and responsibilities of the client-side project manager...*" (para 2).

This paper investigates the role client-side project managers play in creating value through their projects. Traditionally, project management has been classified as a form of production management (Koskela and Howell, 2008, Koskela et al., 2006, Usher, 2014b). Winter and Szczepanek (2008) believe this has lead the profession to base its understanding of value creation on the 'value-chain' model originally developed by Porter (1985). In this model, value is considered to be an economic function of the product developed. In other words, the product itself is inherently valuable.

The fundamental problem with perceiving value as an inherent characteristic of the product created is that it assumes the product represents the same value for all users (Edkins et al., 2013, Ippolito, 2009). However, there is a growing evidence within the project management body of knowledge that suggests this 'one-size-fits-all' concept of value is not supported by the 'lived experience' of practitioners (Cicmil et al., 2006, Lipovetsky et al., 1997, Kärnä, 2014, Parfitt and Sanvido, 1993, Sanvido et al., 1992, Usher and Whitty, 2017d). As Laursen and Svejvig (2016) highlight, "...*delivering a product does not necessarily imply value creation...*" (p. 736).

Winter and Szczepanek (2008) argue that this divide between the profession's traditional understanding of value and the 'lived experience' of practitioners demands project management researchers explore a new framework to think about value creation. Leung and Liu (1998), Chan and Chan (2004) and Winter and Szczepanek (2008) have all suggested that

any new framework selected must conceptualize the delivery process itself as source of value creation.

Matinheikki et al. (2016) suggest that value creation requires practitioners to “...employ a network view taking into account varied needs and different perspectives...” (p. 1238).

Developing these networks requires a System Specialist to design, manage and control these networks (Matinheikki et al., 2017) so that they deliver the required Functionality and Representation of Value expected by the network actors (Möller and Svahn, 2009). Our research will investigate whether client-side project managers fulfil the role of System Specialists.

Systems Specialist require a framework to develop their networks (Wollmann and Steiner, 2017). Usher and Whitty (2017a) introduced the Knowledge Funnel as a framework which client-side project managers use to address paradoxes within Construction projects. This paper will investigate if this Knowledge Funnel is also used by client-side project managers as a framework for developing value-creation networks.

This paper attempts to generate theory from the ‘lived experiences’. Therefore it adopts a Grounded Theory methodology. A methodology which Locke (2003) and Milliken (2010) both suggest is the right methodological fit for this research type. Our research asks two questions:

RQ1: Do client-side project managers fulfill the role of System Specialists in order to create value in their projects?; and

RQ2: Do client-side project managers use a Knowledge Funnel framework to guide the development of value creation networks?

Our research explores these questions by undertaking semi-structured interviews with a cohort of ten client-side project managers working in the Australian Construction sector. Our research investigates the processes they use to manage their projects in order to facilitate the creation of value.

Our findings indicate that client-side project managers do fulfil the role of System Specialists. They achieve this by developing the Structural, Relational and Cognitive Dimensions of the Network Construct, and by using Strategic, Implementation and Fine-Tuning Network Controls.

Furthermore, our findings indicate that client-side project managers do use a Knowledge Funnel framework to guide the development of value creation networks. Through our research we discovered two new phenomena which we have termed, the Nested Project Management Knowledge Funnel and Confidence Locks. Our research indicates that Confidence Locks exist within the Nested Project Management Knowledge Funnel and that client-side project managers must be able to demonstrate how they will achieve both Functionality and Representation of Value before the Confidence Locks will be released.

Our findings have implications for project management research and practice. For researchers, our findings demonstrate that client-side project managers act as Systems Specialists. This finding provides new research avenues in terms of how client-side project managers develop Network Constructs and Network Controls. Furthermore, our discovery of the Nested Project Management Funnel and Confidence Locks provides new areas for research.

For practitioners, our research highlights how a Knowledge Funnel framework can be adopted to create a value network. Our research shows that client-side project management includes activities such as Visioning, Sense-making, Agenda Framing and Network member selection. These activities require different competencies and skill sets to the traditional project management role which must be mastered if practitioners want to create value networks.

9.6 Background and Contiguous Literature

Our literature review will discuss concepts from the ‘project management’ and ‘value management’ bodies of literature. Together these will provide a foundation for the development of our research and findings.

9.6.1 Client-side project management

Client-side project management is a form of project management which focuses on protecting the client's interests in a project, rather than a contractor's or consultant's interests (Helal, 2017). Godbold (2016) highlights that client-side project management protect their client's interests by ensuring that the project deliverables remain aligned with the Sponsoring organization's goals and expected benefits throughout the delivery process.

Client-side project managers operate in complex and dynamic environments that requires them to concurrently utilize both 'Deliberate' and 'Emergent' strategic management skills (Usher, 2014a, Usher and Whitty, 2017b). On the one hand client-side project managers are required to forecast their projects and report to their client using a range of systems and tools drawn from the 'Deliberate' school of strategic management. On the other hand, they adopt tools and systems from the 'Emergent' school of strategic management in order to manage the uncertainty and dynamism inherent in their projects (Usher and Whitty, 2014).

We know that client-side project managers concurrently manage both the technical element of their projects in order to ensure they achieve project success, and the human element of their projects in order to ensure they achieve client satisfaction (Usher and Whitty, 2017d). This requires them to have the intellectual capability and capacity to employ a form of Janusian thinking (Rothenberg, 1980) in which they can work through the detailed minutiae of complex technical problems, while simultaneously comprehending the strategic impacts this will have on their projects (Usher and Whitty, 2017a, Usher, 2014a).

As a result of dealing with these complexities, client-side project managers tend to display high-levels of independent thinking (Walker and Lloyd-Walker, 2014). Godbold (2016) notes that client-side and contractor-side project managers share the same core skills in terms of the "...classical project management competencies..." (para 26). However, Godbold (2016) argues that client-side project managers tend to display greater "...experience, gravitas and credibility..." (dot point 14) and higher levels of competency in "...commercial, leadership, communication, assurance and ethics..." (para 24) than contractor-side project managers.

9.6.2 From ‘project creation’ to ‘value creation’

In 2006, the Rethinking Project Management Network was commissioned by the UK’s Engineering and Physical Science Research Council to investigate future avenues for project management research (Winter et al., 2006). This two-year study found that project management needed to explore new research fronts if it was to successfully face the challenges of the future. One of these fronts was research which shifted the focus of the profession from ‘project creation’ to ‘value creation’ (Winter et al., 2006)

In recent years, a new paradigm for understanding value and how it is generated has begun to emerge from within the strategy literature (Lund, 2010). This new paradigm perceives value as deriving from providers, suppliers and clients working together to create the service or product which is to be provided (Ippolito, 2009). These actors work collaboratively to personalize the delivery experience, the services provided and the final product (Prahalad and Ramaswamy, 2004).

Laursen and Svejvig (2016) have argued for the profession of project management to adopt this new model of value creation, but have also noted that in order for this to occur practitioners need to reconceptualize project management as a social process, rather than a technical or implementation process. This requires project managers to understand that the value they bring to the project delivery process is not just as a technical provider, but through the management of highly complex networks (Ippolito, 2009).

Lund (2010) and Prahalad and Ramaswamy (2004) have explained that developing a ‘value network’, rather than a ‘value-chain’, requires service providers to accept that value is a unique proposition that is assessed differently by different actors. This assessment can depend on who is doing the assessment, what is being assessed and when the assessment is undertaken. Gilmore (1997) explains that, within a network, value is assessed by the different actors against two different characteristics of the service or product. These characteristics are; (i) the product’s Functionality; and (ii) the Representation of value that each assessor has individually assigned to both the product and the value creation experience.

In order to create value, a producer must be able to demonstrate that the product will meet the minimal requirements of Functionality (Jordi et al., 2017). In other words, the product must achieve the core purpose that the users wish to put the offering too. Assessing Functionality is a relatively simple task as it is assessed objectively against pre-determined, objective metrics (Usher and Whitty, 2017d, Thomson, 2011).

The Representation of value within the value network literature refers to everything, other than Functionality, that actors expect to achieve from their involvement in the value creation experience. This includes, not only the personal benefits which they will derive from using the product, but also the emotional satisfaction they want to experience by participating in the process (Jordi et al., 2017). Assessment of the Representation of value is conducted subjectively by each individual making it a far more difficult criteria to fulfil (Lipovetsky et al., 1997, Kärnä, 2014, Sanvido et al., 1992).

9.6.3 Value Networks

Ippolito (2009) argues that, in a value network, the essential element of value creation is “... *the capacity to organize ... players who are able to develop flexible, dynamic ... relationships...*” (p.263) . Prahalad and Ramaswamy (2004) explain that value is created in these networks when actors are able to reframe the network relationships according to their individual needs so that each of the varied experiences are personalized to create value.

However, the relationships within these networks cannot be left unchecked as they may produce outcomes that fulfil neither the required Functionality nor the Representation of value that the network must achieve in order to justify its existence. In order to ensure that these relationships do not devolve into chaos, these networks require strong governance structures (Ippolito, 2009, Edkins et al., 2013) and a system of rules, routines and procedures through which they can operate (Lissack and Roos, 1999, Artto et al., 2016, Richardson et al., 2005). Within the network literature these are referred to as the Network’s Construct and Controls (Mitchell, 1969, Granovetter, 1985, Olkkonen et al., 2000).

9.6.4 Network Construct

A Network Construct provides the network actors with a definition of what is to be achieved and the acceptable means for attaining that objective (Edkins et al., 2013). Each Network Construct is unique and evolves from the specific constraints, restraints and parameters dictated by the environment, the requirements and the competencies of the available actors (Mei-Yung et al., 2004).

In project management, these Network Constructs could be likened to the 'Extent of Acceptable States' outlined in the Final State Convergence Model (Usher and Whitty, 2017b) and the boundary conditions outlined in Complexity Theory literature (Anderson, 1999, Wollmann and Steiner, 2017). The Network Construct limits the behaviors of the network so that it can be guided towards an acceptable final outcome (Reynolds, 1987).

Tsai and Ghoshal (1998) and Nahapiet and Ghoshal (2000) propose that a Network's Construct requires the development of three dimensions if it is to achieve its purpose. These are the (i) Structural Dimension; (ii) Relational Dimension; and (iii) Cognitive Dimension.

9.6.4.1 Structural Dimension

Davies (2004) argues that the Structural Dimension is the most important Dimension in the creation of a Network Construct. The Structural Dimension of a Network Construct provides the 'order-generating rules' necessary to prevent the network from collapsing into chaos (Burnes, 2005, Reynolds, 1987). Within a project management network, we conceptualized the Structural Dimension as being comprised of the traditional 'iron triangle' elements of time, cost and scope (Atkinson, 1999). These elements provide the network actors with sufficient detail to understand the acceptable parameters of the network.

Matinheikki et al. (2017) explain that establishing the Structural Dimension in the earliest stages of the network creation is imperative because this Dimension is a pre-requisite for the activities of visioning, sense-making and agenda framing necessary to develop a basis for future collaboration .

Visioning allows the network actors to work collaboratively towards a commonly understood goal (Wasko and Faraj, 2005). It provides a broad understanding of what the network is attempting to achieve so the actors can navigate through uncertainty towards unified and innovative solutions (Matinheikki et al., 2017). Visioning occurs at a strategic level and provides a framework for actors to make sense of the ‘fuzziness’ that exists in initial stages of network development (Artto et al., 2016).

Once the vision of the network is understood, the actors embark on a process of sense-making. This involves developing consensus on the issues which must be addressed if the network is going to deliver the Functionality required by the end product or service (Möller and Svahn, 2009). Sense-making also helps actors forecast the resources required, and to predict when new actors may need to be brought into the network (Möller and Svahn, 2009).

Having completed the process of developing a common understanding (visioning) and identifying the resource and actor selection requirements (sense-making), the network actors move into a process of agenda-framing. Agenda-framing moves the network actor’s understanding from a strategic perspective of what the network is trying to achieve holistically, to a tactical perspective which identifies the specific activities required by each actor in order for the network to deliver the required Functionality (Möller and Svahn, 2009).

9.6.4.2 Relational Dimension

The Relational Dimension of the Network Construct refers to both the connections that exist within the network and the strength of those connections (Matinheikki et al., 2016). Uzzi (1997), Nahapiet and Ghoshal (2000) and Matinheikki et al. (2016) have noted that these connections are critical to the development of trust and confidence within the network so actors can work collaboratively. Liu and Vince (1999) also stress the importance that this trust and confidence have in the effectiveness of knowledge transfer within the network.

Matinheikki et al. (2017) found that another important aspect of the Relational Dimensions is establishing criteria for selecting and introducing new members into the network. They argue that the capabilities of new actors, as well as the timing of their inclusion, has a significant impact on the network’s ability to operate smoothly. Cantù (2010) highlights that, while the

timely inclusion of new capabilities into the network is important, so too is the requirement to moderate who is being allowed into the network. This finding supports the assertions by Matinheikki et al. (2017) and Lund (2010) that the Relational Dimension requires a System Specialist who has (i) the technical expertise to understand how the network operates; (ii) a detailed understanding of how the actors could interact to co-create value required; and (iii) knowledge of how to manage and integrate the network's systems.

9.6.4.3 Cognitive Dimension

The Cognitive Dimension of a Network Construct refers to the knowledge transfer which occurs in the network (Greimas et al., 1989). In other words, how the does the network transfer knowledge from visioning and sense-making (vertical knowledge) into technical artefacts that can be used to share that knowledge with others (horizontal knowledge) (Greimas et al., 1989). Chow and Chan (2008) describe this knowledge transfer as moving from understanding what needs to be achieved into knowing what needs to be done.

The development of the Cognitive Dimension creates the shared narrative necessary to effectively communicate within the network (Cegala, 1981, Wasko and Faraj, 2005). As actors from different fields convert the vision into technical artefacts they create a collaborative understanding of what the network needs to do in order to create value. Matinheikki et al. (2016) found that it is imperative that this process is guided by a System Specialist who has an understanding of what the project is strategically attempting to achieve.

Together these Structural, Relational and Cognitive Dimensions combine to create the Network Construct.

9.6.5 Network Controls

Developing a Network Construct is critical. However, on its own it will not guarantee that value is created within the Network. For this to occur the Network Construct needs Network Controls.

Network Controls are required to monitor and measure the network's activities and to ensure that any deviance from planned activities can be identified and corrected, in order to ensure the network achieves its goals (Hrebiniak and Joyce, 1984). Project managers are skilled at planning and controlling projects using mechanistic project management systems (Usher and Whitty, 2017c, Baker et al., 2008, Bryson and Bromiley, 1993). However, Hitt et al. (2011) argue that not all activities required for a value creation network can be controlled using traditional project management tools and systems.

Muralidharan (1997) argues that Network Controls have two broad purposes. Firstly, to control the network's strategic content (i.e. the visioning, sense-making and agenda-framing activities). Secondly, to outline the implementation process and 'order generating rules' necessary to ensure the network outputs achieve the required Functionality and Representation of value from within the known constraints, restraints and parameters (Burnes, 2005, Wollmann and Steiner, 2017).

Asch (1992) and Johnson et al. (2011) argue that incremental changes are regularly taking place within complex networks and that the cumulative effect of these changes can impact the direction of the network causing it to move outside the parameters of Network Construct. For this reason they believe a third type of Network Control is required. This third type of Network Control is similar to Söderholm (2008) and Usher and Whitty's (2017c) Fine Tuning activities.

The literature indicates that value creation networks require three types of Network Control in order to be effective. These *Controls* are summarized in Table 9-2.

Table 9-2: Network Controls necessary for value networks to be effective.

Control type	Description
Strategic	Visioning, sense-making and agenda-framing activities. (Muralidharan, 1997)
Implementation	Traditional Project Management tools used to ensure <i>Functionality</i> and <i>Representation</i> of value are achieved (Burnes, 2005, Wollmann and Steiner, 2017).
Fine Tuning	Corrective actions to ensure the cumulative effect of marginal changes do not affect the value offering. (Asch, 1992, Johnson et al., 2011, Usher and Whitty, 2017c)

9.6.6 Systems Specialists

The literature highlights that a network requires the development of both a Network Construct and Network Controls in order to create value.

Matinheikki et al. (2017) argue that the creation of the Network Construct and Network Controls requires a System Specialist who can “...*formulate the initial vision,[and] facilitate ... member selection by inviting organizations with specific backgrounds to the development meetings...*” (p.128). The role of System Specialist is fundamental to the development of a value creation network. The role demands a person who has both technical and organizational skills (Edson, 2012), and who can link strategy and operations by acting as both visionary and facilitator (Matinheikki et al., 2017).

Matinheikki et al. (2017) explain that System Specialists create the ‘...*cognitive baseline...*’ (p.128) which guides collaborative decision making. In doing so, the System Specialist becomes the controller of the collective sense-making activities, although oftentimes they are not the network decision makers.

The System Specialist is also instrumental in developing trust, commitment and confidence among the network actors (Liu and Barabási, 2016). System Specialists require a combination of social cognition (Cantù, 2010), extensive knowledge of their field and creativity

(Matinheikki et al., 2017) in order to facilitate the Relational Dimension of the network. Edkins et al. (2013) also argue that this combination of social, technical and creative competencies is also required to control the “...*down-stream execution*...” (p.72) (Implementation) necessary to achieve Functionality.

9.7 Knowledge Funnels

Wollmann and Steiner (2017) assert that networks require frameworks to guide their development if they intend to deliver value. While Burnes (2005) warns that without a framework to direct their development, complex systems such as networks, can devolve into chaos.

In their research into how client-side project managers address the paradoxes inherent within Construction projects, Usher and Whitty (2017a) investigate a framework called the Knowledge Funnel. They claim practitioners utilize this framework to guide them through the paradox management process and argue for client-side project managers to adopt the Knowledge Funnel when managing poorly-defined problems.

As Ben Mahmoud-Jouini et al. (2016) note, Knowledge Funnels do provide a framework for managing complex issues however they are “...*system of spaces...rather than...predefined series of orderly steps*...” (p. 148) . Practitioners navigate through these spaces to develop innovative solutions to complex issues (Brown, 2008). These spaces are described as ‘Mystery’, ‘Heuristic’, and ‘Algorithm’ (Martin, 2010, Graham et al., 2006, Leavy, 2013).

At the commencement of the Knowledge Funnel process, mystery surrounds the requirements, expectations and, in some cases, the final requirements that must be delivered (Lenfle, 2008). Martin (2009) explains that the Mystery space is typically a “...*search for patterns*...” which requires a “...*discovery-driven approach*...” (Chap 1: Section ‘It Starts with a Question’) . This process create hypotheses which can be tested to assist with the sense-making process (Conforto et al., 2014).

Moving through this process of discovery allows the practitioner to *develop a Heuristic* understanding of the problem. Martin (2009) explains that a heuristic understanding

“...represents an incomplete yet distinctly advanced understanding of what was previously a mystery...” and allows an *“...organised exploration of possibilities...”*. (Chap 1: Section ‘It Starts with a Question’).

The final space in the Knowledge Funnel requires the creation of Algorithms to deliver the required outcomes. Martin (2010) explains that algorithms differ from heuristics in that they present a guarantee that, in the absence of any intervention or unforeseen events, the desired outcome can be delivered by anyone with access to them with *“...more or less equal efficiency...”* (p. 39).

9.8 Research Questions

The literature has demonstrated that project management requires a new framework to think about value, if it is to move from project-creation to value-creation. Value creation networks are one possible framework to achieve this.

We know that developing a value creation network requires a System Specialist who can develop the Network Construct and Network Controls. We suspect that client-side project managers fulfill this role in their projects. To explore this our research asks:

RQ1: Do client-side project managers fulfill the role of System Specialists in order to create value in their projects?

We investigated this research question by searching for evidence of client-side project managers:

- (i) Developing the three dimensions necessary for a Network Construct;
- (ii) Developing the three types of Network Controls; and
- (iii) Managing the selection and invitation of members into their project networks.

The literature has also demonstrated that networks require a framework to guide their development. We suspect that client-side project managers use a Knowledge Funnel as their framework for achieving this. To explore this our research asks

RQ2: Do client-side project managers use a Knowledge Funnel framework to guide the development of value creation networks?

We investigated this research question by searching for evidence of client-side project managers utilizing a Knowledge Funnel framework to guide the development of value creation networks.

9.9 Research Methodology

Our research adopts a Grounded Theory research methodology. Grounded Theory is a qualitative research approach that provides a good methodological fit for research attempting to generate theory from social processes and ‘lived experiences’ (Bryant and Charmaz, 2007, Glaser, 2014).

Grounded Theory is an iterative process in which research themes emerge through the simultaneous collection and analysis of data. (Milliken, 2010). The Grounded Theory process is not rigidly structured. This allows researchers both time and space to develop a deeper understanding of the data so they can react responsively to emergent themes (Franco, 2005, Wastell, 2001).

For our research framework we adapted a Knowledge Funnel (Usher and Whitty, 2017a) to align with the network literature (Figure 9-2).

KNOWLEDGE FUNNEL

NETWORK

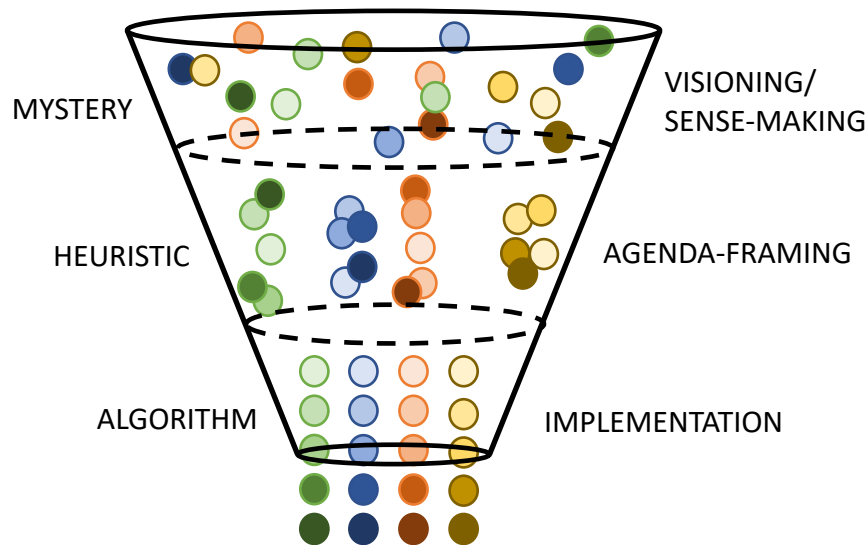


Figure 9-2: Usher and Whitty (2017a) Knowledge Funnel aligned with the network literature.

9.9.1 Data collection and analysis

This research was undertaken over an 18 month period and involved conducting semi-structured interviews with a purposively selected sample of client-side ten project managers within the Australian Construction sector. Although not a large sample we considered this size sufficient based on the work of Algeo (2012) and Mumford and Gold (2004) who argue that a sample size as small as five is sufficient to ensure validity within targeted, qualitative research such as the one outlined in this paper.

All of our research participants were male with between three and eighteen years' experience as client-side project managers in the Australian Construction sector. At the time of conducting the interviews all of the research participants were managing multiple projects. Their clients included Federal and State government departments and agencies (8 projects); Institutional clients such as education or health (4 projects); and private organisations including Not-for-Profits and developers (6 projects).

We explored whether the research participants developed the three dimensions of a network *Construct* by asking three questions: (i) How they typically commenced their role with their

clients? (ii) What they felt was the most important role they played in managing their projects?; and (iii) How they managed the transfer of knowledge within their project network?

We explored whether the research participants developed network Controls by asking: (i) How they ensured their project maintained its strategic goal?; (ii) How they ensured their project actually achieved the required outcomes?; and (iii) How they managed unexpected events that occurred during project delivery?

We explored whether the research participants acted as System Specialists by asking: How new members were brought into their project networks?

We explored the existence of a Knowledge Funnel by asking: How the research participants ‘moved’ their projects from the initial stages of the construction process, through to completion?

Each interview was between 60-90 minutes in length. The interviews were digitally recorded before being transcribed into a qualitative data analysis program (Nvivo). All of the recordings, transcripts and data analysis are retained on a password-protected computer. The privacy of each research participant is maintained through the application of a re-identifiable code (PM01-PM10) during the transcription process. Only the lead researcher has access to the personal data assigned to each of these codes.

The data analysis commenced by reducing the collected data into ‘thought units’ ranging from sentences to paragraphs using a process similar to that outlined by Ashill et al. (2003). These thought units were reviewed for evidence of the research participant’s developing the Structural, Relational or Cognitive Dimensions of a network Construct. Following this analysis we revisited the data looking for evidence of the research participants developing Strategic, Implementation and Fine-Tuning Controls. We then returned to the data in search of evidence that the research participants were managing the selection and inclusion of new members into their project networks. Finally, we reviewed the data one last time searching for evidence of a framework similar to a Knowledge Funnel.

9.10 Findings

We will now outline our findings in relation to the research questions.

9.10.1 Network Construct

Our research was looking for evidence of the research participants developing the three dimensions necessary for a Network Construct.

9.10.1.1 Structural Dimension

To explore the creation of the Structural Dimension we asked the research participants how they typically commenced their role with their clients? The research participants told us:

“... it’s a matter of being able to draw an “all-in picture” of ... cost, time, quality, facility benefit, and then marry it all back to that original project benefit...”
(PM03)

“...I develop a User Requirements Brief...it’s what the Users want to be able to do with their facility, without looking at the technical requirements...it’s just about ‘you want to walk in and have this experience’...” (PM07)

“...We help them define what the scope is, what they want, what the requirements are, what the budget approved is, what their timeframe expectations are, who are the key people... All of those constraints or expectations on the project, they need to be identified upfront...” (PM09)

In these responses we saw the research participants gathering information so they could define the parameters of the Network Construct. In these responses we also saw a process of visioning (...draw an “all-in-picture...), sense-making (...what the Users want to be able to do with the facility...) and agenda-framing (...those constraints or

expectations on the project...) which the network literature describes as activities associated with development a network's Structural Dimension.

9.10.1.2 Relational Dimension

We asked the research participants what they felt was the most important role they played in managing their projects? We were told:

"...it's all about the relationship. I would say that the relationship, and how you've gone building that, is just as important - if not more important - than the product itself... How effective we can be depends a lot of the time on trust. How much they [stakeholders] trust us and how much they trust our experience ..." (PM04).

What are you really dealing with? You're dealing with people. So what is the key thing about project delivery overall? It's about the emotional side of all that. So your success factor is directly related to the emotional side... that's a key thing..." (PM10).

Our data indicates that developing the Relational Dimension is a critical function of the client-side project manager. In reviewing PM04's comments regarding the development of those relationships we were reminded of Matinheikki et al. (2017), Uzzi (1997) and Nahapiet and Ghoshal (2000) observations that one of the roles of the System Specialist in the Relational Dimension is to build trust and confidence between the network actors.

9.10.1.3 Cognitive Dimension

To explore the client-side project managers role in creating the Cognitive Dimension, we reviewed the data for instances of Vertical to Horizontal ($V \rightarrow H$) knowledge transfer. In particular we looked for instances of transferring Strategic knowledge to Technical teams. We asked the research participants how they managed the transfer of knowledge within their project network? They told us:

“...We had to... make sure we captured enough information on what the client wanted so the Designers would know what the standards and codes would be required...” (PM04).

“... Our job is to start putting the client’s needs into descriptive words that can then be passed to consultants who can turn these into drawings...” (PM06)

These comments demonstrate that the research participants were developing the Cognitive Dimension by transferring information using a $V \rightarrow H$ knowledge transfer. However, what was interesting is we also found evidence of the research participants facilitating $H \rightarrow V$ knowledge transfer, in which unexpected events were converted into strategic terms so that the clients understood the impacts these might have on the Functionality and/ or Representation of value.

“...I think what we are there to do is to tell the client what is happening, what is likely to happen, what are the risks of things happening if they don’t do certain things...” (PM03).

“...We need to understand the nature of the change... discuss it with the client ... and to give advice on what can and should be done as a result of those changes...” (PM04).

These responses indicated that the research participants were developing the Cognitive Dimension of the network through knowledge transfer. The responses indicated that the research participants were interpreting information for the different network actors and presenting this in terms which the actors could understand.

Our data indicates that client-side project managers are actively involved in the development of the Structural, Relation and Cognitive Dimensions necessary for the creation of a Network Construct.

9.10.2 Network Controls

Our analysis of the data shows evidence of the research participants developing the three types of Network Controls.

9.10.2.1 *Strategic Controls*

In order to test for client-side project managers creating Strategic Controls, we asked the research participants how they ensured their project maintained its strategic goal? They told us:

“...It’s checking in with those business objectives at each point in the process to make sure what you’re originally setting out to do is still consistent as you’re progressing with the project...” (PM02).

“...Personally I think that the project benefits can get detached from the whole process pretty rapidly...people just want to build stuff... the fundamental thing you need to do is to make sure it achieves a business case ... I think the client side PM [project manager] should be ... pulling everyone up...and link building with ...whatever the actual strategic goal was...”. (PM03).

The data indicates that the research participant’s saw Strategic Control as one of the roles of a client-side project manager.

9.10.2.2 *Implementation Controls*

To test whether client-side project managers developed Implementation Controls, we asked the research participants how they ensured their project achieved the required outcomes? The research participants told us:

“... you’ve got Gantt chart, cost plans, specifications, scoping documents...”
(PM02).

“... Budget, brief and program are the three pillars; So time control, cost control, and quality control, although quality can also be interpreted as a scope...” (PM06)

All of the research participants indicated they used traditional project management Controls such as Gantt Charts, Cost plans and Specifications to manage the delivery of their projects. We interpreted these tools as being the Implementation Controls of the network.

9.10.2.3 *Fine Tuning*

To test for evidence of Fine-Tuning Controls, the research participants were asked how they managed unexpected events that occurred during project delivery? They told us:

“...we were able to find a solution within less than a few days, the path, the budget, the quality was still being met, because it was done with the relative level of ease - for me that was just fine-tuning...” (PM01)

“...you don’t bother the Client with the day-to-day stuff, ultimately that’s your responsibility they are paying you to handle those sorts of issues for them...”
(PM06)

In these responses we saw the research participants undertaking corrective actions to ensure the cumulative effect of marginal changes do not affect the network’s ability to achieve the Functionality (*“...path...budget...quality was still being met...”*) or Representation of value (*“...you don’t bother the Client...”*) necessary for the creation of value. This indicated that the research participants were implementing Fine Tuning Controls in their network.

9.10.3 System Specialist

Our analysis of the data shows evidence of the research participants acting as System Specialists. We asked them how new members were brought into their projects? We were told:

“...we have to get the stakeholders to agree to what they want, then we procure the designers and they want to know a whole new raft of information. They design up what the stakeholders said they wanted, and then we procure the contractors, who need to almost restart the conversation because they need to know a whole new range of information, so they submit Requests for Information, ... then the contractors actually deliver it...” (PM09)

“ ... we'll go off and get an Architect to do the detailed design, then we get the contractors on board to do the Construction works. So the process is to work out the scope, get that agreed and signed off, and then move forward and find the designers. But the interesting thing is that at each stage, after we get endorsement by the sponsor and stakeholders and we bring in someone new like the architect or the engineer, they want to re-open the discussion because there are new things that they need to know, so we go through the process again... then we get endorsement from the sponsor and stakeholders again....then we have to get a contractor involved and guess what? They want to restart the process again, and ask questions, and get inputs about the things that they need to know, so it almost like we go through this agreement, new stakeholder, discussion, agreement, endorsement process every time we bring a new team member on board...” (PM08)

We found these responses particularly interesting as they indicated that, not only were the research participants responsible for member selection and inclusion, but that each time a new member was brought into the network, the Structural, Relational and Cognitive Dimensions of the network had to be reviewed and reiterated to the network actors. This process takes on further significance in our findings regarding the Knowledge Funnel and in

our discussion on how the Network Construct, Network Controls and Knowledge Funnel all interact in the value creation process.

9.10.4 Knowledge Funnel

Our analysis of the data shows evidence of the research participants utilizing a Knowledge Funnel framework for value creation. We asked the research participants how they ‘moved’ their projects from the initial stages of the construction process, through to completion?

60% of the research participants (PM02, PM04, PM06, PM07, PM08, PM10) made reference to moving through a 3 phase process of ‘Discovery’, ‘Detailed design’ and ‘Construction’. Furthermore, two of the research participants specifically described the process as a Funnel:

“... [it’s] like a funnel...in the first instance you need to define how wide the funnel is...” (PM07)

“...you’ve got to define the funnel to make sure the project ends up at a point inside that funnel...” (PM08)

This progression through a 3 phase “...funnel...” is a clear indication that a Knowledge Funnel was being applied by the research participants. Another particularly interesting perspective on the 3 phase knowledge funnel as it applied by client-side project managers, was offered by PM10 who described the process as taking place on different ‘levels’, which he called the “...macro...” and “...micro...” levels.

In referencing these ‘levels’, PM10 described a 3 phase Knowledge Funnel *within* a 3 phase Knowledge Funnel. Furthermore, PM10 described how he would use this same process again when resolving specific problems or challenges. This indicated another ‘level’ of the Funnel. We termed this third level the *nano* level as it aligned well with the nomenclature used by PM10. We termed the process described by PM10, the ‘Nested Project Management Knowledge Funnel’. Figure 9-3 provides a visual representation of the Nested Project Management Knowledge Funnel as we conceptualize it.

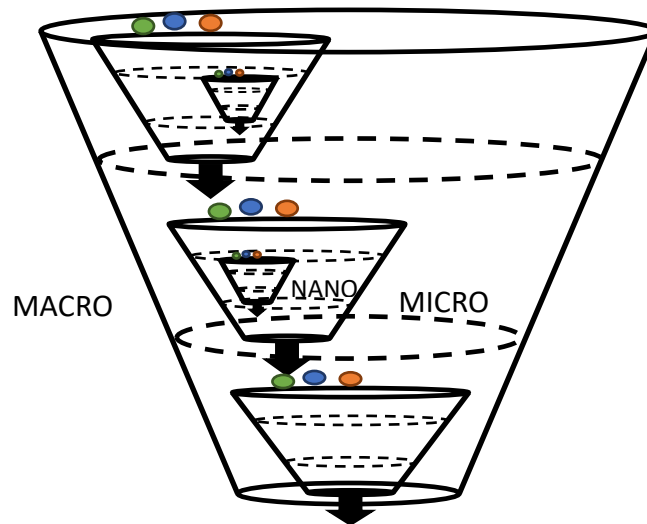


Figure 9-3: Nested Project Management Knowledge Funnel

9.10.5 The discovery of ‘Confidence Locks’ in the Knowledge Funnel

One theme that repeatedly emerged from within the data was the concept of creating Confidence. Responses such as:

“...we have to get them [Sponsor and stakeholders] to the point where they are happy to move forward, or they will go back and we start again...” (PM01).

“...You need to get them [Sponsor and stakeholders] to a point where they are confident and happy to say, ‘Okay, yes. We can accept that and are happy to proceed on that basis’...” (PM09)

“...You’ve got to massage everyone’s expectations and their fears...you’ve got to provide...certainty...that’s what gives them the confidence to keep going...” (PM10).

The data shows that creating Confidence for the network’s actors is an important function of client-side project manager’s role. This function is important to our research question when we consider Matinheikki et al. (2017), Uzzi (1997) and Nahapiet and Ghoshal (2000) findings

regarding the development of trust and confidence as critical elements of the Relational Dimension and a fundamental responsibility of a System Specialist.

Our data indicates that creating a threshold level of Confidence was necessary before the network decision makers would authorize client-side project managers to progress their projects into the next space in the Knowledge Funnel. We coined the term ‘Confidence Locks’ to describe the hold points within a Knowledge Funnel that must be released by the client-side project management practitioner if the project is to proceed.

9.11 Discussion

We will now discuss our findings as they pertain to the research questions.

9.11.1 The client-side project manager as a System Specialist.

The literature indicates the System Specialist is responsible for developing the Network Construct and Network Controls, and for moderating new member selection into the network.

Our research provides evidence of client-side project managers developing the network’s Structural, Relational and Cognitive Dimensions. Together these findings strongly indicate that the client-side project manager is responsible for developing the Network Construct.

We found evidence of client-side project managers developing Strategic, Implementation and Fine-Tuning Network Controls. The purpose of these Network Controls are to guide the actions of the network actors so they work together to create value.

Our research also found evidence of client-side project managers making decisions regarding what members would be invited to become involved in the project’s network. Thereby moderating the selection and inclusion of new members into the network.

When viewed holistically, our research strongly suggests that client-side project managers act in the role of System Specialist in order to facilitate the creation of value when delivering projects.

9.11.2 Nested Project Management Knowledge Funnels and Confidence Locks.

Our data indicates that client-side project managers use a Knowledge Funnel framework to guide the development of value creation networks when delivering Construction projects. In addition, our research indicates that Confidence Locks exist between each of the Knowledge Funnel spaces. Based on our research we believe one of the most important roles the client-side project manager undertakes in the value creation process is to release these Confidence Locks.

We propose that in all cases, the default position for these Confidence Locks is locked. Until the network decision makers release the Confidence Locks it is impossible for the project to move into the next Knowledge Funnel space. Our understanding of the importance of releasing the Confidence Locks is visually represented in Figure 9-4.

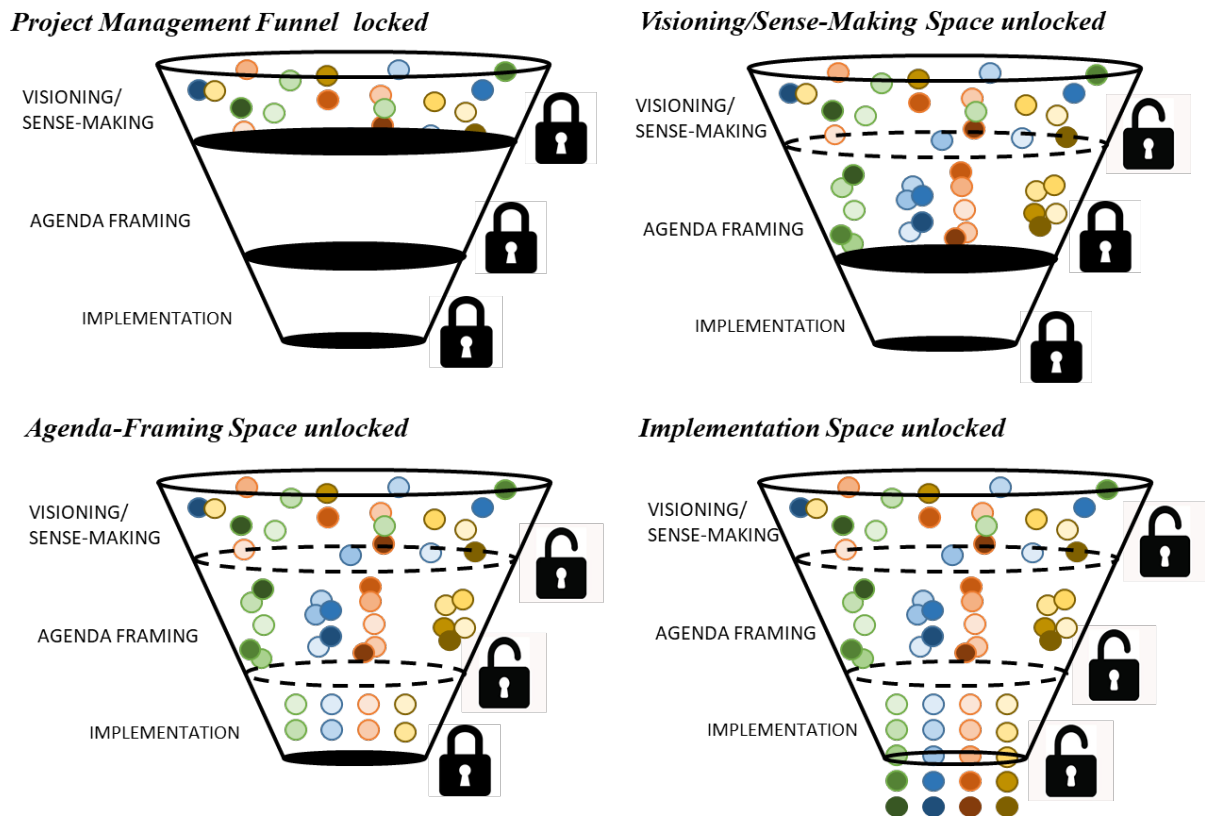


Figure 9-4: Confidence Locks in the Project Management Knowledge Funnel

From Matinheikki et al. (2017), Nahapiet and Ghoshal (2000) and Uzzi (1997) we know that developing this trust and confidence is part of the Relational Dimension managed by the System Specialist. From the work of Gilmore (1997), Prahalad and Ramaswamy (2004) and Ramaswamy (2008) we know that the creation of value only occurs within a network when both the Functionality and the Representation of value are demonstrated.

From this, and based on our data, we propose that in order for a Confidence Lock to be released the client-side project manager, acting as a System Specialist, must demonstrate to the network decision makers that the project can successfully deliver the Functionality required and fulfill their Representation of value. If the client-side project manager (System Specialist) cannot demonstrate this to the network decision makers, the Confidence Lock remains closed and the project cannot progress. If they can demonstrate this, the network decision makers release the Confidence Locks and the project can progress. Figure 9-5 illustrates our Confidence Locks proposition.

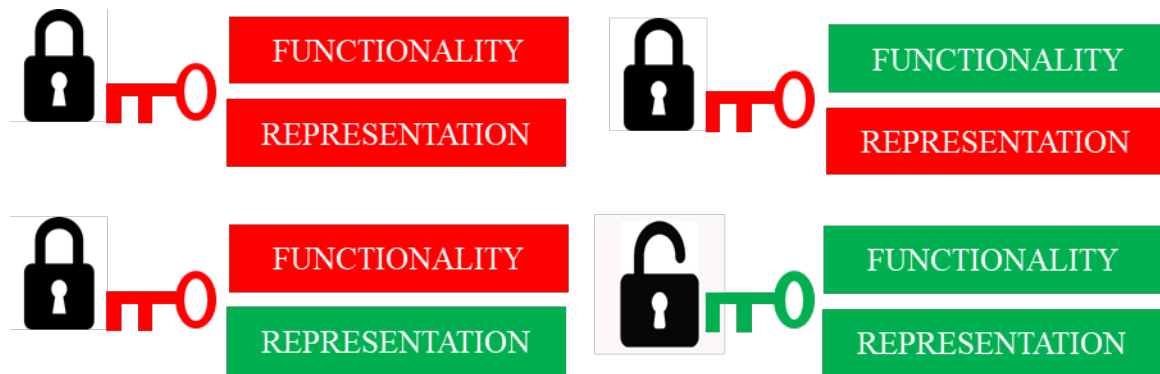


Figure 9-5: The criteria for releasing Confidence Locks

9.11.2.1 The Nested Knowledge Funnel and the System Specialist

PM10 introduced the concept of a Nested Project Management Knowledge Funnel. We found this concept intriguing because it described a fractal-like nature to the Project Management process which does not appear to be discussed elsewhere in either the Project Management or Design Thinking literature.

We found that the Project Management Knowledge Funnel operates in three different ‘levels’ during the Construction process. In network nomenclature these levels can be termed ‘Visioning/Sense-Making’, ‘Agenda-Framing’; and ‘Implementation’. Our research found that these levels operate in a nested manner throughout the Construction process, as we shall now explain.

At the commencement of the Construction project, the client-side project manager performs visioning and sense-making activities with the network actors. Specifically, they “... *define what the scope is...*” (PM09) so they can “...*draw an all-in-picture...*” (PM03). The purpose of this visioning and sense-making is so the client-side project manager can “...*go off and get an Architect to do the detailed design...*” (PM08). In this initial process, the client-side

project manager works through a three phase Knowledge Funnel, starting with an exploration of what the network actors want achieved; followed by defining these requirements into the scope for the project; and finally codifying the scope into an algorithm (i.e. i.e. procurement documents such as the User Requirements Brief, Deliverables Schedules and contracts) that can be used to procure other network actors (i.e. the designers). The algorithm prepared by the client-side project manager outlines both the Network Construct and the Network Controls necessary for the new actors to be brought into the Network. Figure 9-6 provides a graphic representation of this process.

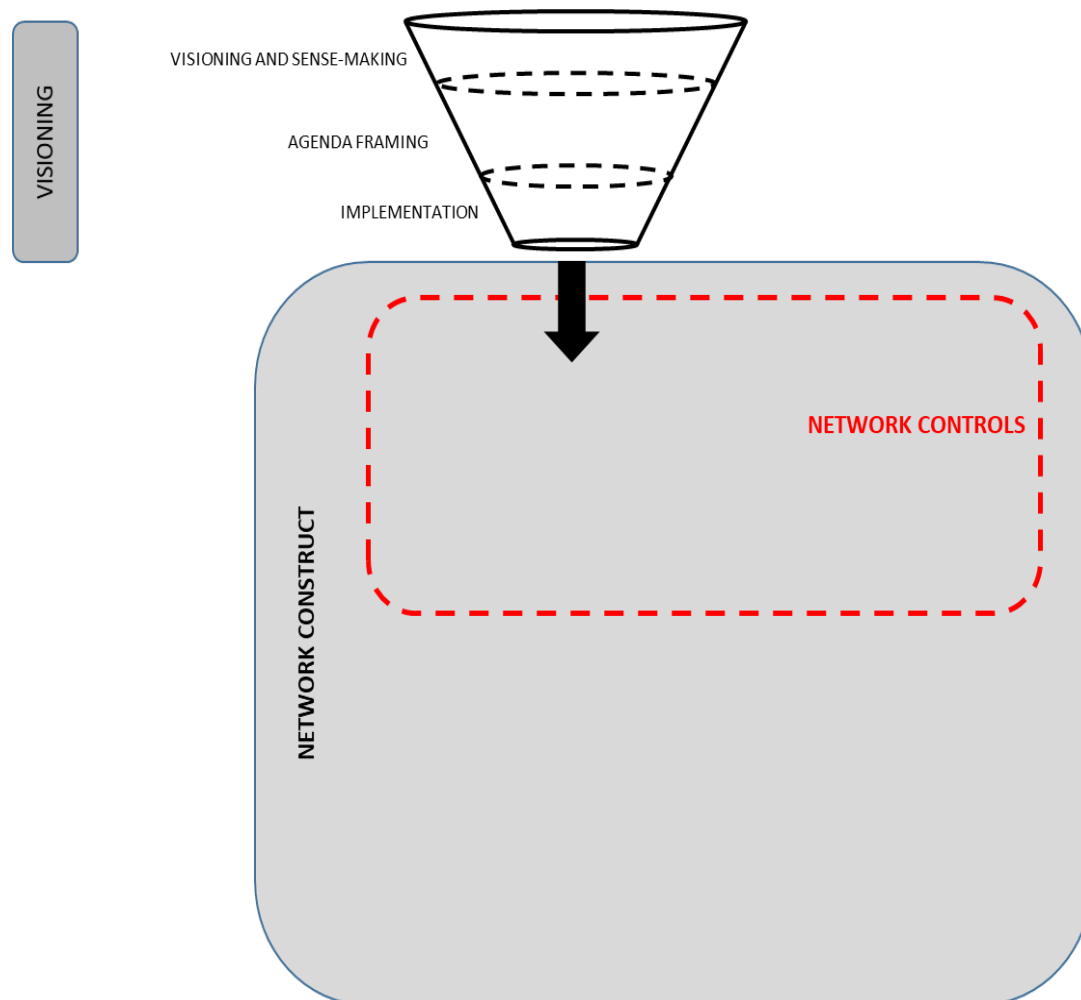


Figure 9-6: Nested Project Management Knowledge Funnel (Macro-level Visioning Phase)

It is interesting to note that, at the end of this macro-level phase, the network actors already involved in the project have completed their Visioning process, while those about to be invited (i.e. the designers) have not yet undertaken this process. Thus, we find that when the new actors (i.e. designers) are permitted into the network through the procurement process, they find it necessary to commence their experience in the network by undertaking their own three-phase Knowledge Funnel commencing with a ‘visioning and sense-making’ process. This process was described by PM08 “... *then we procure the designers and they want a whole raft of new information...*” and by PM 09 “...*we bring in someone new like the architect or engineer, they want to re-open the discussion because there are new things that they need to know, so we go through the process again...*”.

This process will allow the new network actors (i.e. designers) to move through their own three-phase Knowledge Funnel and eventually produce the Network Controls for the next Phase in the macro-level Knowledge Funnel. These Network Controls will be an algorithm consisting of a suite of new documents such as the plans, specifications and Construction contracts which will have been developed to inform, monitor and control the actions of a new member (i.e. the Contractor) who is about to be invited to join the network. Figure 9-7 provides a graphic representation of this process.

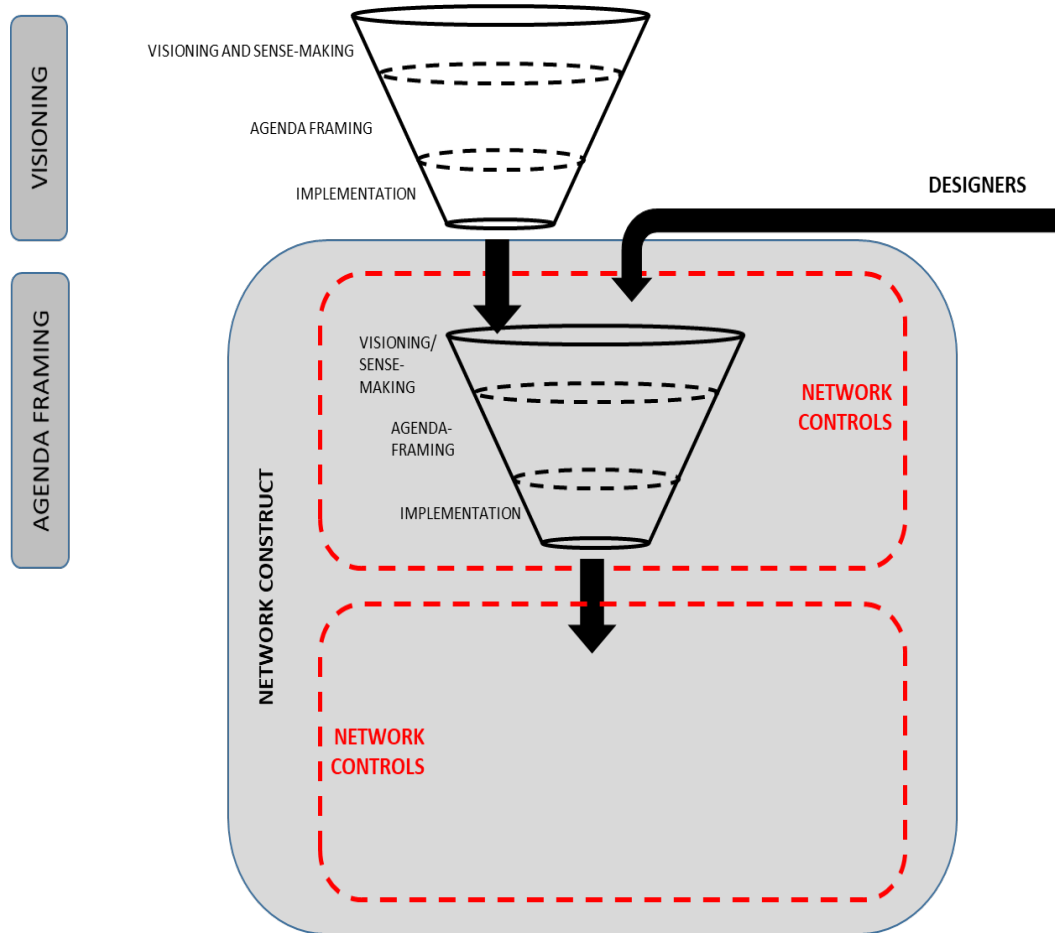


Figure 9-7: Nested Project Management Knowledge Funnel (Macro-level Agenda-Framing Phase)

In a manner similar to that undertaken with the designers, the new network members (i.e. the contractors) need to commence a three-phase Knowledge Funnel process, beginning with their own ‘visioning/ sense-making’ process. This, again was described by PM08 “...and then we procure the contractors, who need to almost restart the conversation because they need to know a whole new range of information...” and PM09 “...then we have to get the contractors involved and guess what? They want to restart the process again, and ask questions, and get inputs about things they need to know...”.

Now, although these new network actors are starting their three-phase Knowledge Funnel process with ‘visioning/sense-making’, for the actors involved at the commencement of the macro process (i.e. the original network members), the involvement of the contractor signals the third and final stage of their journey, the Implementation Phase. The final outcome of which is the same of all network actors as it is the completion of the Construction process.

Nested Project Management Knowledge Funnel (Macro-level Implementation Phase). Figure 9-8 provides a graphic representation of this process.

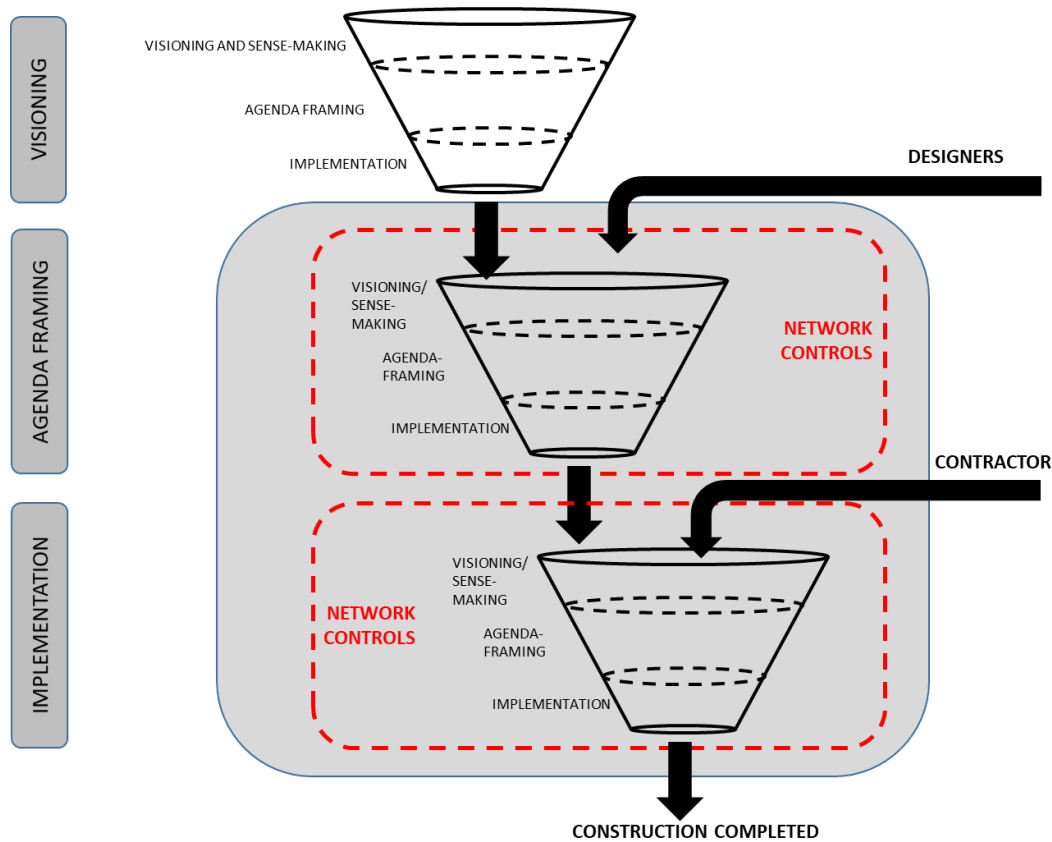


Figure 9-8: Nested Project Management Knowledge Funnel (Macro-level Implementation Phase)

Our model indicates that, although all the network actors have the same temporal location (i.e. all involved in the project at the same time), their perception of the Construction process can be significantly different depending on when they were invited into the network. In our opinion, this has the potential for different ‘realities’ to be operating within the Project Management Knowledge Funnel as different Network actors may have different understandings of where the project is at. These dualities/pluralities of ‘reality’ also need to be managed by the client-side project manager (i.e. System Specialist) if they are to create the confidence necessary to release the Confidence Locks.

9.12 Conclusions

Our research asked two questions:

RQ1: “Do client-side project managers fulfill the role of System Specialists in order to create value in their projects?”; and

RQ2: “Do client-side project managers use a Knowledge Funnel framework to guide the development of value creation networks?”

With respect to RQ1, our research found that client-side project managers undertake activities which Matinheikki et al. (2017) argue are normally associated with the role of a *System Specialist*. Specifically, that client-side project managers:

- (i) Develop the Structural, Relational and Cognitive Dimensions associated with creating the Network Construct;
- (ii) Manage their projects by putting Strategic, Implementation and Fine Tuning Network Controls in place; and
- (iii) Moderate the inclusion of new members into the network.

Based on our research we found that client-side project managers may fulfil the role of System Specialists in order to create value in their projects.

With respect to RQ2, our research discovered the Nested Project Management Knowledge Funnel and its associated Confidence Locks. Our research indicates that client-side project managers appear to use a Knowledge Funnel framework to guide the development of value creation networks.

Our research adds to the project management literature by demonstrating how client-side project managers create value in their projects by establishing and managing networks. Our findings open new avenues for project management research and practice by conceptualising the value creation process as a network rather than a chain.

The discovery of the Nested Project Management Knowledge Funnel adds to the existing project management body of knowledge by demonstrating how client-side project managers

adopt a Knowledge Funnel framework to develop Network Constructs and Network Controls. Our research creates new avenues for research into this framework.

Finally, our research has identified the phenomena of Confidence Locks that exist within the Nested Project Management Knowledge Funnel. We posited that releasing Confidence Locks is a threshold requirement necessary for progressing a project through this funnel. We also posited that these Confidence Locks are only released by the network decision makers when the client-side project manager can demonstrate that both the Functionality and Representation of value they have for the project have been achieved. Finally, we posited that it is possible for multiple ‘realities’ to exist within the Project Management Knowledge Funnel and the client-side project management must manage these in order to release the Confidence Locks.

9.12.1 Limitations of this research

The Generalizability of our results is impacted by two aspects. Firstly, our research sample was drawn exclusively from the Construction sector. Secondly, our research sample, although sufficient to provide validity in our research, was small. These limitations can be overcome by conducting similar research in other sectors and with a larger research sample.

We also note that all of our research participants were male. This introduces the possibility of a gender-bias into the results. This limitation could be overcome by conducting future research with a mixed gender sample.

9.12.2 Implications for research and practice

Our findings have implications for the research and practice of client-side project management.

9.12.2.1. Project Management Research

Our research adds to the literature by exploring the ‘lived experience’ of client-side project managers through a value network lens. We discovered how client-side project

managers adopt the role of System Specialists to develop network Construct and Controls to ensure their projects deliver both the Functionality and Representation of value required by the network actors. In doing so, our research provides new insights which can be explored by future research.

In addition, our discovery of the Nested Project Management Knowledge Funnel and the Confidence Locks provides avenues for further research. Specifically, into how this Funnel operates and the role that client-side project managers play in ensuring these Confidence Locks are released by the Network decision makers.

9.12.2.2. Project Management Practice

Our findings have a number of implications for the practice of client-side project management. Firstly, by drawing on the value network literature, we were able to provide a new conceptualization of the role of the client-side project manager. This has the potential to change the way practitioners understand their role in the project management process.

Secondly, our findings highlight that client-side project managers need to ensure they develop both a Network Construct and Network Controls in order to create value in their projects. Our research indicates that value creation requires practitioners to perform Visioning/Sense-making and Agenda Framing activities. These tasks require different competencies to those outlined in traditional ‘Implementation Only’ project management literature.

Finally, through our discovery of the Nested Project Management Knowledge Funnel and its associated Confidence Locks we have created new paradigms through which client-side project managers can understand their role in the value creation process. It is our hope that by identifying these new phenomena, client-side project managers can improve their ability to deliver both the Functionality and Representation of value required by the network actors and thereby find new ways to create value through their projects.

10 Discussion

This thesis contributes to the client-side project management body of knowledge in four areas. These are:

- (i) Challenging some of the dominant ideas inherent in Traditional Project Management theory as it pertains to the ‘lived experience’ of client-side project managers;
- (ii) Exposing some of the dualities and pluralities within the ‘lived experience’ of client-side project managers and explaining why these are important to the continued development of the discipline;
- (iii) Presenting new practices and tools which client-side project managers can utilize ; and
- (iv) Demonstrating how client-side project managers can shift from ‘project creation’ to ‘value creation’.

These contributions are now explained in more detail.

10.1 Challenging some of the dominant ideas of Traditional Project Management theory.

In order to further develop the discipline of project management the Rethinking Project Management Network called for new empirical research which “...*contrasts with...the dominant ideas contained within the published literature...*” (Winter et al., 2006 p. 640). This thesis addressed this call in a number of ways.

Firstly, this thesis clearly demonstrated a number of disparities which exist between Traditional Project Management theory and the ‘lived experience’ of client-side project managers who work in the Australian Construction sector. Chapter 3 identified and articulated the underlying assumptions of Taylorism, Fordism and Shewhart’s quality

theories to demonstrate a significant number of incongruities between the ‘lived experience’ of client-side project managers, and the theory which supposedly underpins their discipline.

By exposing these incongruities this thesis provides avenues through which researchers and practitioners can move beyond Traditional Project Management theory and explore new theories which help better support the ‘lived experience’ of client-side project managers. To assist with this exploration, this thesis presented the ‘lived experience’ of client-side project managers from new and novel perspectives. Drawing on contrasting ontologies, alternate epistemologies and new lenses through which the ‘lived experience’ of client-side project managers can be viewed, this thesis answers the call for new insights into “...*project complexity, social process...[and] project conceptualization...*” (Cicmil et al., 2006 p.676).

This thesis also challenged the dominant ideas in the scholarly literature by presenting new and novel ways to explain the practice of client-side project management. Drift-Changes (Chapter 4), Project Management Yinyang (Chapter 5), the Final State Convergence Model (Chapter 6), Design Thinking (Chapter 7 and 8), the role of System Specialist (Chapter 9), the Nested Project Management Knowledge Funnel (Chapter 9), and Confidence Locks (Chapter 9) all challenge the belief that client-side project management can be understood using a “...*rational, universal, deterministic model...*” (Winter et al., 2006 p.640). Instead, these models create “...*multiple images...*” (Winter et al., 2006) of the practice of client-side project management and encourage a more expansive view of the discipline. Rather than perceiving project management as a discipline which emphasizes “...*planning and control...*” (Winter et al., 2006 p.640) these models emphasize the non-linearity, non-sequentiality, complexities, dualities and pluralities which are inherent within the practice of client-side project management, as evidenced through the ‘lived experience’ of the practitioners.

10.2 Exposing some of the dualities and pluralities that exist within client-side project management.

This thesis highlights the existence of dualities and pluralities within client-side project management. A cursory reflection of the existence of these dualities and pluralities may not appear to provide a significant contribution to the client-side project management body of

knowledge. However, as Luhmann (2006) and Seidl and Becker (2006) highlight, dualities and pluralities create tensions. Until these dualities and pluralities can be clearly defined their systemic discourses cannot be understood and therefore these tensions cannot be exposed and managed.

This thesis has identified a number of dualities and pluralities within client-side project management. Dualities and pluralities such as the deliberate/emergent nature of project management (Chapter 3), the project success vs. client satisfaction paradox (Chapters 4,5 and 6), the predictable vs. unpredictable nature of Construction project (Chapter 7) and the control vs. flexibility paradox inherent in Construction projects (Chapter 7). By exposing these dualities and pluralities this thesis has made a number of contributions to the client-side project management body of knowledge.

For instance, by providing evidence of these dualities and pluralities this thesis challenges the assumption that practice of client-side project management can be explained using “...*one simple, all-encompassing model or theory*...” (Winter et al., 2006 p.643). Instead, by presenting evidence of the existence of these dualities and pluralities, this thesis encourages researchers and practitioners to expand their understanding of the discipline and search out broader theoretical foundations. By demonstrating that these dualities and pluralities operate using different functional systems, systemic-discourses and language games, this thesis demands a broader, richer and more nuanced theoretical foundation for the practice of client-side project management. In addition, this thesis provides evidence of dualities and pluralities operating within client-side project management and thus challenges the existence of a “...*universal, deterministic model*...” (Winter et al., 2006 p.640) of project management.

Not only does this thesis provide evidence of a number of dualities and pluralities that exist within client-side project management, it provides a number of alternative theoretical foundations to help manage these and, thereby, offers guidance on how the theoretical foundation of the discipline can be expanded. This thesis presented alternate bodies of theory such as Strategic Management, Complexity, Network and Design Thinking theories, as well as alternate philosophical perspectives such as Interpretivism and Taoism. While this thesis does not necessarily endorse these as a panacea for the theory/praxis divide, it does demonstrate that new and novel paradigms can, and should, be explored as the project management community attempts to develop their discipline.

10.3 Client-side project management Practices and Tools

This thesis contributes to the development of the discipline of client-side project management by discovering a number of practices and tools which practitioners can adopt to augment and enhance their skills.

Firstly, through the identification of Drift-Changes (Chapter 4), this thesis highlighted the practices of Fine-tuning, Revisions and Re-openings. These three practices can be utilized by practitioners when they are faced with unexpected events. This thesis provided guidance to client-side project managers on how to identify the change typology they are facing, and provided them with a clear understanding of the corrective action they should adopt to address them. In addition, Chapter 4 also explained the importance of recognising and understanding a project's trajectory and the need for client-side project management to be able to shift goal modalities when faced with Drift-Changes.

This thesis also presented the practice of structural coupling within client-side project management. Both Chapter 5 and Chapter 6 discussed the importance of creating tight structural coupling of project success and client satisfaction through the practice of Funnelling and Convergence. These practices are fundamental to the management of dualities and pluralities within client-side project management.

Finally, this thesis demonstrated how Design Thinking is practiced by client-side project managers to help them make sense of poorly-defined projects and manage paradoxes. In addition, this thesis discovered the practice of Optioneering which can be adopted by client-side project managers to manage the paradoxical tensions created by the predictable vs. unpredictable nature of Construction projects and the need to ensure both control and flexibility are maintained throughout the Construction process.

10.4 From ‘project-creation’ to ‘value-creation’

This thesis contributes to the body of knowledge by exploring the role client-side project manager have in creating value. In doing so, this thesis directly answers the Rethinking Project Management Network’s call for research that shifts project management from ‘project-creation’ to ‘value-creation’.

This thesis has demonstrated how client-side project managers add value to the Construction process by using Design Thinking. Client-side project managers use Design Thinking to hold the predictable vs. unpredictable and the control vs. flexibility paradoxes open, in order to allow creative solutions to emerge and consequentially captured.

This thesis has presented research which demonstrates that client-side project managers adopt all of the Design Thinking Mentalities, Thinking Styles, Practices and Tools. As Design Thinking is a problem-solving activity, these findings provide evidence that client-side project management moves beyond the traditionally accepted ‘implementation only’ role, and into the role of ‘problem-framer and solver’ in order to create value.

Finally, by conceptualising client-side project managers as System Specialists, this thesis has highlighted the role they play in developing the Construct and Controls necessary to create value through a network. The discovery of the Nested Project Management Knowledge Funnel and its associated Confidence Locks highlight the critical role client-side project managers have in ensuring project decision makers have the Confidence they need to endorse and authorize the progress of their projects through the Nested Project Management Knowledge Funnel. Thereby delivering both the Functionality and the Representation of value necessary for them to achieve both project success and client satisfaction.

11 Conclusion

11.1 Summary of thesis contributions

The previous chapter presented a number of contributions which this thesis has made to the client-side project management body of knowledge. These contributions range from being philosophical and theoretical, to the practical, and to explaining the routine. In many ways, these multi-faceted contributions mirror the ‘lived experience’ of the client-side project manager. These thesis presents client-side project management as a discipline that is a rich blend of theory and practice, and which sees both the stressful and challenging intermingled with the common place and routine.

This thesis has demonstrated that Traditional Project Management theory does not sufficiently support the ‘lived experience’ of client-side project manager. This thesis has clearly shown that the discipline of client-side project management cannot be adequately explained by the theories which would have projects follow a well-planned, deliberate, linear, sequential and rational path to completion.

This thesis highlighted that the ‘lived experience’ of client-side project management is a nuanced combination of dualities and pluralities that create persistent tensions and demand a balance of objective and subjective ontologies; Positivist and Interpretivist epistemologies; Deliberate and Emergent planning; and Strategic, Implementation and Fine-Tuning Controls.

11.2 Implications of the contributions

I will now discuss the implications of the contributions of this thesis for client-side project management researchers and practitioners.

11.2.1 Implications for project management researchers

This thesis has challenged the philosophical, ontological and epistemological foundations of Traditional Project Management theory which currently underpin the practice of client-side

project management. In doing so, this thesis has a number of implications for client-side project management researchers.

Firstly, by articulating the underpinning assumptions of Transformational Production Management this thesis allows researchers to interrogate these more precisely. This thesis provides a clear outline of these assumptions and provides a framework for understanding why these assumptions do not completely support the ‘lived experience’ of client-side project managers in the Australian Construction sector. By presenting these assumptions and framework in this manner, this thesis provides client-side project management researchers the opportunity to explore alternate theories which will better support the ‘lived experience’ by augmenting the existing body of theory.

Secondly, this thesis presented new and novel ways of understanding client-side project management. By viewing the practice of client-side project management as a non-linear, non-sequential process, this thesis provides a basis for new conceptualizations of client-side project management. Researchers could use these new conceptualizations to build new theory for practice and extend our understanding of how client-side project managers can create both Functionality and Representation of value in the delivery of their projects.

This thesis has exposed a range of dualities and pluralities within client-side project management and highlighted the significant impact these have on both theory and practice. This thesis has by no means exhausted the research opportunities these dualities and pluralities present to expanding our understanding of client-side project management. Researchers can use the findings of this thesis as the basis for finding new dualities and pluralities, exploring the ones identified in this thesis in more depth, investigating how these impact on project management theories of planning and control, and researching the impact that these have on the value-creation process.

Finally, this thesis has developed a range of new models for understanding the ‘lived experience’ of client-side, project management. These present new opportunities for researchers to test these models and to give a deeper understanding of the ‘lived experience’ of client-side project management.

11.2.2 Implications for project management practitioners

This thesis has presented a range of new practices and tools which client-side project managers can explore in order to enhance their skills and improve the project delivery experience for both themselves and other project stakeholders.

For example, this thesis clearly demonstrated that practitioners cannot rely completely on frameworks, methodologies or practices that emphasize the need for project planning and control above all else. The discovery of Drift-Changes, the demonstration of multiple pathways to project completion, the importance of funnelling, convergence and Optioneering and the evidence of dualities and pluralities within client-side project management all demand that practitioners think more broadly about what their role is, and how they create value in the project delivery process.

In addition, this thesis has provided sufficient evidence to demonstrate that client-side project managers need to develop their Design Thinking abilities and include Design Thinking tools and practices in their project management repertoire.

This thesis demonstrated that achieving project success, client satisfaction, and creating value requires client-side project managers to manage both a Positivist paradigm and an Interpretivist paradigm within their projects. This thesis has explained why managing both paradigms is critical for creating the Confidence that project decision makers need before they will release a project's Confidence Locks.

Finally, this thesis highlighted to client-side project managers the role they play in developing the Structural, Relational and Cognitive Dimensions of the project Construct. It also explains why client-side project managers need to hone their skills in developing Strategic, Implementation and Fine-Tuning Controls if they want their project to deliver the Functionality and Representation of value demanded by their clients.

11.3 Limitations of this thesis

The most significant limitation of this thesis is that it focusses exclusively on one specific form of project management. This thesis explored the ‘lived experience’ of a cohort of client-side project managers who work within the Australian Construction sector.

Although the qualitative nature of this research has allowed this thesis to delve deeply into this cohort’s experiences it does so at the expense of generalizability. Whilst this does not negate the contributions of this thesis, it does limit them.

This focus on a single cohort also introduces the potential for gender bias, organisational and cultural bias as well as introducing a bias resulting from limited project diversity. All of these are easily overcome through future research with a larger and more diverse research sample.

While this thesis has demonstrated that Traditional Project Management theory is not broad enough to support the ‘lived experience’ of client-side project managers in the Construction sector, it has only explored a limited number of alternate theories to augment this. The rationale for the selection of comparative bodies of theory were explained in the relevant chapters and many of these highlighted the shortcomings of Traditional Project Management theory. However, a fully-formed theoretical alternative to Traditional Project Management theory has not been presented in this thesis. As a result, there is significant amount of research still required before any alternate bodies of theory are selected to augment the theoretical foundations of client-side project management.

11.4 Future Research opportunities

Throughout this thesis opportunities for future research have been presented. These include:

- Broader exploration into the phenomenon of Drift-Changes, specifically into how these are identified and managed by client-side project managers;
- Further investigation into the corrective actions of Fine-tuning, Revisions and Re-openings to manage unexpected events;
- New and more detailed investigations into the types of dualities and pluralities that exist within the client-side project management with particular focus on their systemic

discourses, their impacts on the different project stakeholders, and how client-side project managers address these;

- Investigations into alternate philosophies, ontologies, epistemologies not addressed in this thesis that might support and augment Traditional Project Management theory;
- A deeper exploration of Strategic Management, Complexity and Network theories and their potential to augment the theoretical foundations of client-side project management;
- Further development of the Final State Convergence Model by investigating the influence that client-side project managers have on the transition process, and how the Actual Final State is achieved from the multiple pathways available;
- A more detailed investigation of Design Thinking within client-side project management. In particular what practices and tools utilized in ‘design’ could be adopted or adapted to assist client-side project managers;
- Further exploration into the process of Optioneering. Specifically, into the processes used to develop and present options.
- Additional research into the Nested Project Management Knowledge Funnel. In particular, how this discovery can be used to develop new tools to manage the Construction process;
- Continued research into the role of client-side project managers as System Specialist, with a particular focus on how the Network Construct and Controls are developed; and
- Further research into Nested Project Management Knowledge Funnel and its associated Confidence Locks with specific attention paid to exactly how these locks work and what client-side project managers must do in order to release them.

11.5 Final Remarks

This thesis addresses the scarcity of client-side project management research by exploring the role of client-side project managers working in the Australian Construction sector. By looking deeply into the ‘lived experience’ of these practitioners this thesis has discovered that the practice of client-side project management is not well supported by Traditional Project

Management theory. To address this, the thesis has sought out new and novel approaches to explain the ‘lived experience’.

This thesis challenges the belief that client-side project management can be explained using a “...*rational, universal and deterministic model*...” (Winter et al., 2006). In doing so, it juxtaposed with many of the dominant ideas that pervade the project management literature. This thesis presents client-side project management as a discipline that requires a broader and far-reaching theoretical foundation if it is to effectively manage the tensions created by dualities and pluralities. This thesis has also uses “...*multiple models*...” (Winter et al., 2006) to explain the ‘lived experience’ of client-side project managers and presents new and novel ways of understanding their experiences.

This thesis conceptualizes client-side project managers as Design Thinkers and System Specialist. In doing so it expands our understanding of the client-side project manager’s role, from one of just a project implementer, to problem framer and solver, and even a Construct, Controls and confidence creator.

This thesis encourages client-side project management researchers and practitioners to look beyond the confines of Traditional Project Management theory for new theories to support their experiences. This thesis provides new and novel perspectives, paradigms, approaches and models to explain and support the practice of client-side project management.

Finally, this thesis demonstrates that one of the key roles of a client-side project managers is to develop, manage and control complex and dynamic networks. This ability is fundamental if client-side project managers wish to create Confidence amongst the complexity.

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